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A REPORT ON THE SANITARY CONDITION

OF
The City and Borough of Bath,

DURING THE
YEARS 1867 & 1868,

WITH A

Synopsis of that of several previous Years ; together with
a Geological, Meteorological, and General Topographical
Sketch of the City and its Vicinity, in relation to
matters connected with the

PUBLIC HEALTH,

BY

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for the City and Borough of Bath, Surgeon to the Bath Eastern
Dispensary, to St. Catherine's Hospital, and to the Insti-
tution for Idiot Children, Medical Registrar to and
Conservator of the Museum at the Royal
United Hospital.*

Published with the consent of the Local Board of Health.

"Every Life in the Community is surrounded by dangers, which it
is the business of Science to study and of Art to avert."—*Dr. Farr.*

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PREFACE.

A CONSIDERABLE portion of the following pages is original ; the remainder consists of information collected from various sources bearing on the General and Sanitary Condition of the City of Bath.

27, *The Paragon* ;
March, 1869.

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Second Report on Public Health.

Third Report on Public Health.

Second Report of Health of Towns Commission.

Second Report of Bath Health of Towns Commission, 1848.

Reports of Social Science Association (*Dr. R. D. Thompson*).

Annual and Quarterly Returns of the Registrar-General of England.

Census Returns, 1861.

Ordnance Survey of England.

Report upon Cholera in 1849, by the Registrar-General.

Annals of Influenza, Sydenham Society.

Frankland on the Water Supply for the Metropolis.

Symons's British Rainfall, 1860 to 1868.

Reports of the Glasgow Corporation Water Works, 1855.

Conybeare and Phillips's Geology.

Dyke on the Sanitary Condition of Merthyr-Tydfil, 1866, 1867.

Hanham on the Sanitary State of the Bath Union, 1864.

Mainwaring on the Cholera Epidemic of 1832, at Bath.

Dr. Davies on Epidemic of Typhoid Fever in 1849, at Bath.

Dr. Goodridge on Cases of Typhus in 1864, at Bath.

Ekin on the Water Supply to Bath.

STATEMENT OF DUTIES OF THE OFFICER OF HEALTH, AS DEFINED BY THE BATH TOWN COUNCIL.

1.—The Officer of Health and the Inspector of Nuisances, recently appointed by the Council, shall co-operate with each other under all circumstances, and especially when any extraordinary emergency arises.

2.—The Officer will place himself in immediate communication with the Registrars of the various sub-districts, and obtain from their books a weekly return of deaths, with the localities in which they occur.

3.—Based on these returns and the Census Table of Population the Officer of Health will furnish to the Local Board of Health, weekly, a statement of the number of deaths in the whole Borough, with the ratio of deaths to population. When any marked deviation from the usual average occurs, he will specially call the attention of the Board thereto, noting for them the localities in which the deviation takes place, and so far as he can he will assign the causes.

4.—His attention will be specially directed to the prevalence of epidemic or infectious diseases, whether or not there be any increase in the rate of mortality; he will seek information on such facts in relation to those diseases as come under his own notice, or may be supplied to him by others.

5.—From the Registrar's returns he will make out a list of all houses in which deaths may occur from Zymotic diseases, with the view to make a special inquiry into their condition, as regards drainage, ventilation, cleansing, water supply, &c., and report thereon to the Board as may be needful.

6.—He will make a list of all streets, courts, and other inhabited places, in which to enter weekly all deaths occurring in each such locality, noting the character of the disease, age, &c., with especial reference to certain diseases, such as Fever, Scarlet Fever, Consumption, Small Pox, &c.

7.—When so many as three deaths occur in any one house in a year, it will form an object for special inquiry and inspection, with a report to the Board if it should appear needed. These inquiries will have their first application in the poorer and most densely inhabited districts of the Borough.

8.—As regards the more general nature of his duties, he will be expected, with the assistance of the Inspector of Nuisances, to make himself acquainted with all matters likely to act injuriously on the public health ; to make himself aware of the general condition of drainage, cleansing, water supply, the crowding of dwelling houses of the poor, especially the lodgings for vagrants and travellers, the existence of noxious trades and processes, and generally to keep a continuous supervision over the public health, and all circumstances likely to produce unfavourable effects upon it.

9.—He will make a weekly report thereon to the Local Board, such reports to be brief and succinct, unless when special circumstances may require fuller detail.

10.—He shall, on the 31st January in every year, prepare and submit to the Board a full report on all points affecting the health of the Borough for the year ending 31st December preceding.

JOHN STONE, *Town Clerk.*

Approved by me, G. GREY,
Home Office, Whitehall, 20th January, 1866.

Sanitary Condition of Bath.

SECTION I.

SITUATION.

BATH is built partly on the slope and lower part of a hill rising from the right bank of the river Avon, where it forms a considerable bend round from east and west to north and south, the more ancient portion being at the bend and on the lower ground ; and partly on the eastern bank of the same river, but on this side rising, except as scattered villas and minor ranges of houses, to a less elevation than on the right bank. The houses on Beechen Cliff are about 300 feet above the sea level, and those at Macaulay Buildings and the upper part of Bathwick Hill from 400 to 540.

Lansdown, forming the continuation of the hill on which a large part of Bath stands, is elevated about 735 feet above the sea, according to a map of the city from a survey by the late J. H. Cotterell, Esq., in 1852 ; but according to the Ordnance Survey of England it is 813 feet. The city has a striking appearance when viewed from the Wells Road, its various crescents and ranges of houses rising above each other from the lower ground to the crest of Lansdown. The bulk of the buildings shade off, as it were, by means of detached ranges of houses and villas, the latter dotted thickly about the outskirts.

It is a handsome city, and from the abundance and small cost of the stone quarried around, and the facility of working

it, houses are easily constructed; and even when small, present a better appearance than those of the same character in most towns.

The river Avon is navigable up to Bath, and the navigation is continued by the Kennet and Avon Canal into the Thames; so that the city possesses water communication with Bristol on the one side and London on the other.

Communication with all parts of the kingdom is established by the Great Western Railway and its branches; and a branch from the Midland Railway at Mangotsfield to Bath is in course of construction, which will form an important link with the lines in the Midland and Northern counties.

CLIMATE AND METEOROLOGY.

A great part of the city is, from its situation, sheltered from the northerly winds, but at the same time that portion is freely swept by those from the westward and southward, and these are the most prevalent. Other parts of the city are open to the easterly winds and such northerly winds as find their way down the Avon Valley. These, with the variable heights of the houses above the bottom of the valley, afford obvious causes for differences of temperature in different parts of Bath; and observations respecting it in one part of the city may vary much from those in another.

The following Table shows the mean temperatures of the months in the years 1842 and 1843, from the Meteorological Register kept by the late Mr. Biggs, of Charles Street:—

TABLE I.

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
°	°	°	°	°	°	°	°	°	°	°	°
38·5	39·5	45·5	49·5	53·5	60·5	63·5	66	59·5	48	44·5	45·5

This gives an annual mean for the two years of 51·2°. My own observations date from the year 1849, and are as follows:

TABLE II.

Meteorology of Bath for 18 Years, 1849 to 1866.

Year.	MERCURIAL BAROMETER WITH N. ASPECT.						MERCURIAL THERMOMETERS IN SHADE			Most Prevalent Wind.
	Lowest Reading.	Date.	Highest Reading.	Date.	Range of Pressure	Mean Height.	Min.	Max.	Mean.	
1849	In. 28.607	Nov. 5	In. 30.684	Feb. 11	In. 2.077	29.645	17.0	80.2	48.6	
1850	28.096	Nov. 20	30.502	Dec. 23	2.406	29.299	22.1	79.5	50.8	
1851	28.403	Mar. 22	30.412	Dec. 27	2.009	29.407	20.5	81.0	50.7	
1852	28.292	Nov. 16	30.787	Mar. 6	2.495	29.539	24.1	85.6	54.8	
1853	28.447	Feb. 9	30.555	Nov. 9	2.108	29.501	15.8	76.0	45.9	
1854	28.399	Jan. 8	30.742	Mar. 5	2.343	29.570	18.2	82.3	50.2	
1855	28.383	Mar. 22	30.479	Jan. 12	2.096	29.428	14.1	84.0	49.0	N.E.
1856	28.220	Dec. 26	30.638	Jan. 13	2.418	29.429	22.6	87.0	54.8	Var.
1857	28.250	Oct. 8	30.700	Mar. 1	2.450	29.475	22.0	82.7	52.3	E. to S.
1858	28.206	Nov. 26	30.609	Oct. 30	2.403	29.407	22.0	84.0	53.0	S.W.
1859	28.357	Dec. 25	30.806	Jan. 3	2.449	29.582	14.5	82.6	48.5	Var.
1860	28.193	Mar. 31	30.709	Nov. 7	2.516	29.451	10.4	77.3	43.9	S.W.
1861	28.281	Mar. 19	30.792	Feb. 2	2.511	29.807	14.5	81.3	47.9	Var.
1862	29.017	Oct. 19	30.688	Feb. 9	1.671	29.852	22.6	74.0	48.3	W.
1863	28.761	Nov. 2	30.440	Feb. 13	1.679	29.600	26.0	80.2	53.1	W.
1864	28.597	Nov. 15	30.382	Jan. 3	1.785	29.489	17.2	77.0	47.1	Var.
1865	28.432	Jan. 14	30.553	Dec. 15	2.121	29.492	20.8	79.5	50.1	E.
1866	28.940	Mar. 23	30.602	Jan. 25	1.662	29.771	23.7	83.5	53.6	W.S.W.

An analysis of the above Table gives the following results :

Average of all the Lowest Readings of the Barometer	... ..	28.426 in.
Average of all the Highest Readings of the Barometer	... ..	30.615 in.
Mean Pressure during 18 years	... ..	29.541 in.
Average of all the Minimum Temperatures	... ..	19.3 deg.
" " Maximum	... ..	80.9 deg.
Mean Temperature of 18 years	... ..	50.5 deg.

The rainfall at Bath from June, 1841, to June, 1842, amounted to 42·36 inches ; from June, 1842, to June, 1843, 39·63 inches. Mean of the two years—40·99 inches. The mean annual rainfall at Bristol for the 16 years immediately preceeding 1843 was 32·92 inches.

I commenced registering the fall of Rain in 1855, and in 1860, Mr. G. F. Symons, of Camden Town, began to collect observations on the rainfall of the United Kingdom. He has greatly extended this branch of Meteorology, and there are, at the present time, upwards of 1,500 stations where the fall of rain is regularly registered. In the annexed Table is given the rainfall of Bath and its neighbourhood.

The returns in this Table are necessarily incomplete, but it will be seen that there is a considerable difference in the amount of rain even in Bath and its immediate vicinity. The mean annual rainfall at Bath, taken from my own observations, from 1855 to 1868 (14 years), is 35·79 inches. It has been said that more rain falls at Bath than at Bristol. Taking the seven years, 1860—1867 (omitting 1863, for which no information was obtained from Bristol), it will be found that the mean for that period at Bath is 33·08 inches, and for Bristol 31·80 inches, or 1·28 inches more for the former city than the latter. This difference is very inconsiderable if we bear in mind the occurrence of storms, which are usually more severe in hilly districts. It is probable that the climate of Bath does not differ materially from that of Bristol, and may be regarded as generally mild and moist. The south-westerly breezes as they pass over the neighbouring hills deposit a considerable quantity of water which they waft from the Atlantic. The extremes of temperature are not so great as in many other towns, and this fact will be shown in the report of the year 1868 in connection with the great heat during the month of July in that year.

GEOLOGY.

It will be convenient to consider the geological structure of the country on which the City of Bath stands in connection with the rainfall and water supply of the borough.

TABLE III.

Year.	Paragon, Bath, C. S. BARTER.	Literary Institution, C. P. RUSSELL.	Batheaston Reservoir, A. MITCHELL, Esq.	Swainswick, Rev. F. LOOKER.	Weston.	Castle House, Calne, Col. WARD.	Badminton, J. THOTTER.	Bristol Institution.	Bristol, Small Street.	Clifton, Dr. BURDER.	Chew Magna, Bristol Water Works.	Mells Rectory, Rev. J. H. HORNBER.	Downside, Rev. T. B. SNOW.	Market Lavington, F. STRATTON, Esq.	Trowbridge, J. A. RYER, Esq.	Marlborough, Rev. T. PRUSTON.	Highworth, E. DYMOND, Esq.	Gloucester, Dr. WILLIAMS.	Berkeley, Rev. G. PRATT.
1855	In. 33.47	In.	In.	In.	In.	In.	In.	42.96	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
1856	40.85	.....	.....	.....	.....	22.26	.....	29.59	.....	40.80	.....	46.57	.....	.....	.....	.....	.....	28.01	.....
1857	40.44	.....	.....	.....	.....	33.27	33.14	.....	.....	31.31	.....	31.98	.....	.....	.....	28.90	.....	21.83	.....
1858	30.23	.....	.....	.....	.....	33.27	33.14	.....	.....	32.87	.....	48.86	.....	.....	.....	31.22	.....	28.08	.....
1859	44.50	.....	.....	.....	.....	25.88	30.68	30.89	.....	32.26	.....	.....	43.62	.....	.....	28.84	.....	20.06	.....
1860	44.67	.....	.....	.....	.....	22.49	30.88	30.89	.....	32.26	.....	.....	27.67	.....	.....	21.29	.....	17.11	.....
1861	34.02	.....	.....	.....	.....	20.17	24.86	21.93	.....	32.26	.....	.....	43.09	.....	.....	34.23	26.35	21.81	29.37
1862	48.19	.....	.....	.....	.....	29.92	35.12	33.82	34.16	32.75	.....	.....	43.09	33.33	30.65	34.23	26.35	21.81	29.37
1863	37.95	.....	.....	.....	.....	31.83	35.12	33.82	34.16	32.75	.....	.....	43.09	33.33	30.65	34.23	26.35	21.81	29.37
1864	19.62	.....	.....	.....	.....	33.90	.....	33.82	37.70	40.11	40.87	47.57	.....	37.33	31.39	38.05	.....	27.12	36.91
1865	28.15	.....	.....	.....	.....	33.90	.....	33.82	31.12	33.97	32.96	39.39	.....	30.95	30.18	33.04	.....	21.76	28.79
1866	36.75	36.60	40.35	28.52	36.48	33.90	.....	.....	31.12	33.97	32.96	39.39	.....	30.95	30.18	33.04	.....	21.76	28.79
1867	30.45	30.45	29.16	24.54	30.58	30.28	.....	.....	31.12	33.97	32.96	39.39	.....	30.95	30.18	33.04	.....	21.76	28.79

The nearly horizontal beds of clays, limestones, sands, and sandstones on which the city is built, constitute a portion of the series of rocks to which the term *oolitic* has been given, from the oolite or oviform grains in many of the limestones; and the city and its environs are indebted for their appearance to the limestone beds—named the Bath oolite—extensively quarried in the neighbouring hills, especially on Claverton and Combe Downs. From Cheltenham the escarpment of the hills and inferior junction of the great oolite passes about five miles east of Gloucester (having too out-liers of inferior oolite, Churchill and Robinswood Hill, on the north-east and south-east of that city), and pursuing its course to the south is deeply indented by the vale of Stroud, beyond which it projects in a bold cape hanging over Wotton-under-Edge, and then continues in a nearly straight line almost due south, ranging immediately west of the road from Gloucester to Bath to within four miles of the latter city, around which all the streamlets flowing into the Avon run through valleys of denudation, deeply furrowing the high platform of the oolite hills. Thus, the brook flowing from Langridge by Swainswick entirely cuts the ridge of Lansdown from the main chain; and that coming down from St. Catherine to Batheaston nearly affects Charmey Down and Solsbury Hill (an insulated summit of the great oolite) in the same manner. Bathford stands at the mouth of another similar valley extending upwards to Box; and the main valley of the Avon continues to form a denudation in the inferior strata as high up as Bradford, where the crop of the great oolite crosses the river. The hill between Midford and Freshford affords the best opportunity near Bath for examining the whole of this series of strata; the valleys are cut down into the upper beds of the lias marl, and in ascending the hill, the inferior oolite, fullers' earth, great oolite, Bradford clay, forest marble, and sandstone are crossed in passing towards the insulated patch of cornbrash, which at Pipe House, crowns the hill. The summit of this hill is covered with transported chalk flints.

To the beds of the great oolite succeeds a considerable

thickness of clay, known as *fullers' earth*, from a minor portion of it furnishing real fullers' earth, much employed in the cloth manufactories at Bradford, Trowbridge, Frome, and Twerton. Richmond Hill and Mount Beacon, on the higher and northern side of Bath, are upon this clay. Beneath this appears the limestone known as the *inferior oolite*. The upper part of Sion Hill, Lansdown Crescent, Springfield Place, Rock House, Lansdown Grove, and the land between St. Stephen's Church and the new road above Camden Crescent are upon this limestone, which is based on sands known as the *inferior oolite sands*, which are not so thick at Bath as at some localities in the vicinity. They form steep ground ranging under the escarpment behind Upper Camden Place, produced by the inferior oolite limestone. The lower part of Sion Hill, All Saints' Chapel, and part of Lansdown Road are also upon these sands, as well as Hampton Row and the land stretching above it and the Canal to the New Warminster Road, the upper part of Sydney Gardens, Sydney Buildings, Darlington Place, and onwards to Cambridge Place and Widcombe Crescent, and from Forefield Place under Beechen Cliff to the top of Holloway.

The position of all the constituent beds in each of the hills hanging over the denuded valleys round Bath may be at once determined from marked features of their outline and profile by a spectator from a distant view, provided he be acquainted with the general structure of the range. The great oolite forms a flat table land on their summits, ending with an abrupt edge; this is succeeded by a gentle slope which marks the subjacent fullers' earth, a greener verdure and rushy grounds arising from the discharge of the oolitic springs thrown out by these clayey beds are here seen. Beneath is the lower terrace of the inferior oolite, which breaks down with a steep and almost precipitous escarpment to the vale. In many instances (as at the north-east of Lansdown, near the Monument) large broken masses of the great oolite, having been precipitated from its escarpment, are spread over the slope of the fullers' earth, presenting a scene of rocky ruin resembling the Undercliff in the Isle of

Wight. This may be seen particularly at Warley Rocks, above Bathford. Similar subsided masses of the inferior oolite are also frequently piled against the foot of its escarpment. The thickness of these beds may be taken altogether at about 250 feet in this district. On Farleigh Down, on Combe Down, and in several other places near Bath, wells have been sunk through the great oolite to the depth of 100 to 130 feet.

Descending in the order of the beds we come to the *marlstone*, which is an indurated condition of calcareous marl mingled with sand, some clay being intermingled. Cavendish Crescent and Place, the higher part of Park Street, part of Lansdown Road, Camden Crescent, Upper Camden Place, the back of Prospect Place, with Stanley Villas, are on the marlstone. The rocks I have enumerated, therefore, support the higher parts of Bath on the north side of the river.

All the remaining part of the city, and consequently the great mass of it, is built on the marls and argillaceous limestones known as the *lias*, with the exception of Pulteney Street, Sydney Place, Bathwick Street, and other streets and places adjacent on the left bank of the river; the North and South Parades, and the various buildings in the Dolemeads, the bottom of Southgate Street, parts of Avon Street and Milk Street, Kingsmead Terrace, Green Park Buildings, Norfolk Buildings, and Norfolk Crescent, which stand on *alluvial ground*, in a great measure composed of *clay*. *Gravel* is very abundant in the Villa Fields and at Larkhall.

The buildings on the oolitic limestones and sand are on dry ground; on the marlstone it is more moist, and on the *lias* and alluvial ground it is naturally damp. On the lower ground, however, where the latter characteristic would otherwise be much felt, the accumulated buildings of centuries and the vaulting on which the houses are erected, greatly tend to prevent the damp character of the ground beneath from being injuriously felt above.

WATER SUPPLY.

As might be anticipated from the inter-stratification of the

different kinds of rock mentioned, conditions for the occurrence of springs are numerous, and accordingly they are not uncommon : from them Bath is supplied with water for domestic purposes, and wells to cut the lines of water beneath the surface are also formed. These wells have often been sunk 130 feet through the rock to its junction with the fullers' earth, which throws out its springs and forms a weeping ground round the escarpments of the oolitic hills. Water can only be obtained from the great oolite in deep wells, and at great expense ; but occasionally the springs of the upper beds sink through the inferior oolite in consequence of some failure in the intervening clay, and this is particularly the case in the forest marble, which has numerous swallowholes, thus absorbing the springs of the cornbrash (or upper layer of the oolite) : this occurs in several instances in the neighbourhood of Bath. As just stated, the fullers' earth clay throws out copiously the waters which have percolated through the great oolite ; those of the inferior oolite and sands are thrown out by the subjacent marls, so that two lines of springs are exhibited, one near the superior extremity of the inferior oolite, and the other near its inferior border. Probably the mineral waters of Bath are thrown out above the lias, near the junction of the marl with the inferior oolite sands.

A large number of the springs rising in the hills above Bath are owned by companies and individuals, who thus supply a considerable number of houses. It is a matter for regret that a large quantity of water runs daily into the river to waste without being utilised for domestic purposes ; and it is to be feared that, from various causes, the water flowing from many of the springs is not so pure as it should be for drinking.

During the last 20 years numerous villas have been built upon the Lansdown Hill, two large Colleges have been erected, and upon the top of Lansdown a Cemetery was laid out in 1848, and since that date a large number of interments have taken place therein. It was a particularly unfortunate site to have chosen for a burial ground, bearing in mind the character of the soil, the percolation of the water, and the

number of springs arising from the hill. The villas and colleges drain into *dead wells*, and lest any misapprehension should arise as to the nature of the latter, I may state that a *dead well* is a cavity made in a porous stratum to save the trouble of emptying, the contents percolating through the absorbent ground; whereas a *cesspool* is a regularly constructed *water tight receptacle*, whence the liquid and solid soil can be removed when the chamber is full. The condition of the springs in this locality is, I fear, not very satisfactory.* It has been stated that, from the declivity of the ground forming Lansdown Hill, the tendency of the water would be to flow towards Charlcombe and thence into the river. If we look at the geological nature of the strata, it will be found that the inclination of the great oolite is towards the *South East*, and all the beds of this formation, including the subjacent lias, have the same dip, except in certain instances of dislocation, or *fault*, as they are termed. But to prove that the tendency of the water would be not to flow towards Charlcombe, it may be stated that about the year 1811 Dr. Parry made extensive excavations for the foundation of his house on Sion Hill, and exposed numerous dislocated fragments of the rock; and at a lower level, in the hollow way by which carriages ascend to this high hill, he sunk pits to a considerable depth. These exhibited enormous blocks heaped up confusedly, some much inclined to the horizon, others nearly vertical, and falling headlong into the vale through which the river flows.

In the year 1846 the Corporation purchased some springs in the vale of Chillcombe, in the vicinity of Batheaston, and constructed two large reservoirs, one holding five and the other four millions of gallons, in which the water from the springs is collected, having been previously filtered, and from whence pipes convey it to the city of Bath. A third and smaller reservoir was added in 1859, the capacity of which is

* At the Meeting of the British Association at Bath, in 1864, Mr. Field drew attention to the manner of draining the Lansdown Villas and the effect it was likely to have on the springs in that locality. ("Brit. Association Report," 1864, p. 129. *Bath Chronicle* Edit.)

114,000 gallons, and its yield per minute 80 gallons. In the next Table is given a list of the companies supplying Bath with water: this information is derived from a Report furnished by Mr. Mitchell, the city engineer, to the Cold Water Committee, in July, 1864, and is essentially correct at the present date.

TABLE IV.

COMPANIES		HOUSES SUPPLIED BY THEM WITH WATER.			
Corporation in Walcot Parish...	2257
„ „ Saint Michael	433
„ „ Saint James	477
„ „ Saint Peter and Saint Paul	321
„ „ Lyncombe and Widcombe	608
„ supplying Breweries	71
„ „ Schools and Churches	23
Total of Houses, &c., supplied by Corporation...					4190
Circus Company...	301
Charlcombe Company	218
Sir James Rivers	276
Freeman's Company (Marlborough Bdgs., &c.)	54
Camden Crescent	21
Caroline Buildings	21
Park Street	37
Cavendish Place (Dickenson)	32
Prior Park Road (Harris)	28
Richmond Hill	11
Beechen Cliff (Miss Mant)	40
Beaufort, East and West parts (Dowding)	10
Widcombe Crescent, &c. (Sillifant)	72
Philip Street and vicinity (Earl Manvers)	80
Prior Park Road, &c. (Cotterell)	16
Prior Park Reservoir	21
Lyncombe Place...	12
Portland Place	8—1258
Total of Houses supplied by Companies and Cor- poration	5448
Total number of Houses in Bath, exclusive of Bath- wick	8249

Houses unsupplied, or that do not obtain their supply					
from any of the Companies	...	...	...	...	2801
Houses with Wells	...	...	...	...	320

The Corporation also supplies 64 houses in the parish of Batheaston and two in Bathwick, seven public drinking fountains* (of which three are for cattle as well as man), and seven public urinals. The fountains and urinals consume water sufficient for the supply of 44 houses.

There are 880 houses in Bathwick parish which are supplied by the estate or from wells.

The present water supply for Bath is quite inadequate, and this is especially observable after a drought, such as occurred in 1864 and 1868. During the summer months of 1868 one of the Batheaston reservoirs was empty, and the second large one contained but a small reserve of water for the number of houses to be supplied by the company. At the end of September the large reservoirs were quite empty. In the neighbourhood of Bath there is abundance of good water to be obtained free from all organic pollution, and the locality to which I especially refer is the Vale of Saint Catherine and the valleys leading into it. It is a matter for deep regret that in the year 1866 the Corporation failed in their endeavours to obtain a better supply of water for the city. How this occurred is not a subject for these pages, but I am pleased to find that there appears to be a reasonable probability of efforts being made in the present year (1869) to obtain an Act of Parliament for a larger supply of water to a city which sadly wants it. It is not desirable to obtain water from springs in the immediate vicinity of the city; from many causes, but chiefly from the contiguity of houses to the springs, the purity of the water is more than questionable. The springs at St. Catherine are not liable to contamination in any way; they are found at various heights, from near the lowest levels of the valleys to within 50 feet of the top of one of the highest hills; they are always running, and the highest

* Ladymead, Walcot Church, Potato Market, Rebecca Fountain, Widcombe Hill, Kingsmead Square, Fountain Buildings.

parts of the borough, as high as above Springfield Place, could be supplied by the Corporation if they obtained possession of these springs. The yield of the springs is 1,000 gallons per minute. The natural facilities for forming reservoirs are also very great; in several of the valleys the hills rise so symmetrically on either side, that by the formation of a bank across from hill to hill a reservoir could be constructed of any size with comparative ease and small outlay.

In some parts of Bath the water supply is very indifferent; the large tract of ground in the parish of Bathwick called the Villa Fields, and upon which nearly 70 cottages are built, depends for its water upon wells and a small reservoir, the latter being quite inadequate for the wants of the inhabitants. The majority of the wells contain hard water, and many of them are polluted by sewage. The *dead well* system prevails most extensively in this district, there being no sewers, and some of the cottagers drink the river water.

From information kindly furnished me by the Engineer of the Manchester Waterworks, I find that the capacity of all the reservoirs supplying that city, with a population of 600,000, is 4,602,000,000 gallons, and that the average consumption is about 14 million gallons *per day*. On comparing these results with Bath, a great contrast will be observed. The reservoirs at Batheaston contain when full $9\frac{1}{2}$ million gallons, and estimating those of Sham Castle, Beacon Hill, and Beechen Cliff to contain together $7\frac{1}{2}$ million gallons, it follows that the capacity of the Corporation reservoirs is about 17 million gallons for the supply of 4,190 houses. Estimating the capacity of the Companies' reservoirs together after the same ratio, at $5\frac{1}{4}$ million gallons, the whole supply for 5,448 houses would be $22\frac{1}{4}$ millions. On referring to Table IV. it will be seen that 2,801 houses are not supplied by any of the Companies or by the Corporation, and to these must be added those in the parish of Bathwick, which are supplied by the estate or from wells. Therefore, according to the estimated population of Bath in 1868, $22\frac{1}{4}$ millions of gallons of water supply 31,776 persons. And to compare this with Manchester we have simply to multiply by 19, which will give, with

a fraction, an approximate result:— $22\frac{1}{4}$ millions $\times 19 = 422\frac{3}{4}$ millions ; and $31,776 \times 19 = 603,774$. So that as the city of Manchester has for its 600,000 inhabitants 4,602,000,000 gallons of water, *every individual in that city has more than ten times the quantity of water which every individual in Bath has*. Surely this is a strong argument in favour of a larger supply of water for this city.

In the following Table will be found a statement of the number of houses supplied by the different London companies, with their average allowance :—

TABLE IVA.

Water Supply in London, Summer of 1868.

COMPANIES.	NUMBER OF HOUSES, &c., SUPPLIED IN		AVERAGE DAILY SUPPLY OF WATER IN GALLONS, DURING THE MONTHS OF	
	July, 1868	Aug., 1868	July, 1868.	August, 1868
Total Supply ...	453,535	454,942	103,263,837	107,989,039
From the Thames...	206,265	206,696	57,923,980	50,782,697
From Lea and other Sources }	247,270	248,246	55,339,857	57,206,342
<i>Thames.</i>				
Chelsea ...	27,072	27,072	9,748,100	9,317,700
West Middlesex ...	38,084	38,084	10,665,049	10,014,740
Southwark and Vauxhall }	71,436	71,478	15,178,697	15,410,081
Grand Junction ...	28,827	28,990	11,121,734	11,417,321
Lambeth ...	40,846	41,072	11,210,400	11,046,500
<i>Lea and other Sources.</i>				
New River ...	114,730	114,956	27,140,000	26,869,000
East London ...	95,998	96,748	19,900,000	15,848,000
Kent ...	36,542	36,542	8,299,857	8,065,697

The quantities of water in the above Table include the supply for manufactures, and for various purposes other than domestic consumption. The return for August, as compared

with that for July, shows an *increase* of 1,407 houses, and a *decrease* of 5,274,798 gallons of water supplied daily.

Assuming that these companies supply all London, every individual therein has a supply of 35 gallons of water per diem.

It being a part of my duties to become acquainted with the general condition of the water supply of the city, I have given in the next Table an analysis of some of the water supplied by the companies, and would premise that it is difficult to obtain water near a city which does not contain any organic matter. The water of Loch Katrine which supplies the city of Glasgow is probably as nearly pure as that of any city or town in the United Kingdom.

Each degree of hardness in columns 5 and 6 of the following Table indicates the amount of hardness that would be produced by adding one grain of pure chalk (carbonate of lime) to a gallon of soft water ; and it will be observed that the water supplied by the Corporation from Batheaston and Beechen Cliff, as respects its organic contents, approaches nearer to the *pure* water of Loch Katrine than any other in the list ; but as regards its hardness, all the water around Bath contrasts unfavourably with that of Loch Katrine, which is obtained from the granite, without any limestone formation which is so abundant around this city, and which causes the hardness of the water. A hard water is disqualified to a certain extent for washing and cleansing purposes, and contamination with sewage matter renders it unfit for drinking. In Glasgow alone the annual saving of soap only, by the introduction of Loch Katrine water for a previous supply of very moderately hard water, has been estimated at £36,000. It is most essential that all water should be thoroughly filtered before entering the mains. Waters vary not inconsiderably in their condition according to the time of year and other circumstances, as may be seen by the accompanying analyses of the water supplied by three of the London companies. (Table VI.)

TABLE V.

Name of Company.	Capacity of Reservoir in Gallons.	Yield per Minute in Gallons.	Analyst.	Hardness Before | After Boiling		Solid Contents per Gallon in Grains 70,000 in 1 Gallon.	Organic Impurity, Grains per Gallon.	Nitric Acid, Grains per Gallon.
Corporation { Batheaston Reservoirs (2 larger ones) Beechen Cliff " Sham Castle " Beacon Hill " Cavendish Crescent ... Charlcombe Company ... Richmond Hill ... Circus Company ... Prior Park Streams ...	5,000,000 } 4,000,000 }	615	Dr. Pakinson...	21.25	...	22.75	0.7	1.54
	101,562	45	Prof. Way ...	31.	14.6	53.9	0.79	3.92
	161,000	28	Dr. Pakinson...	17.5	...	28.03	1.907	3.12
	59,000	25	Dr. Pakinson...	25.5	15.62	45.5	1.55	5.14
	5,525	...	Prof. Miller ...	29.76	6.5	23.67	1.12	0.0
	65,037	40	...	13.	28.	63.7	3.105	0.61
	...	...	Prof. Miller ...	48.	12.5	40.95	3.15	5.6
	...	50	Dr. Pakinson...	36.	...	...	...	...
	...	...	...	26.	...	...	...	...

Loch Katrine (Glasgow) Gorton, Manchester ... Wolverhampton ... Aston, Birmingham ... Bellevue, Nottingham ...	5,556,000,000	34,722	Prof. Miller ...	0.2	...	2.29	0.	0.021
	4,602,000,000	...	Prof. Miller ...	3.3	3.3	6.36	2.04	0.29
	...	...	...	17.6	5.8	20.24	1.76	0.41
	...	...	...	23.1	14.7	40.8	1.92	1.34
	...	...	...	11.8	5.2	16.	0.88	1.3

TABLE VI.

100,000 PARTS OF WATER CONTAINED }	TOTAL SOLID IMPURITY.			ORGANIC CARBON.			ORGANIC NITROGEN.			PREVIOUS SEWAGE CONTAMINATION.			HARDNESS.		
	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.
<i>Thames.</i>															
1867 ...	32.8	23.7	28.5	1.020	.164	.272	.082	.000	.013	3290	1050	2062	22.8	16.	19.3
Jan., 1868 ...	32.2	29.2	30.9	.542	.271	.399	.062	.027	.048	3360.	2920	3150	19.7	15.4	17.3
Feb., 1868 ...	32.6	30.	31.4	.360	.324	.339	.055	.031	.043	3130	2790	3010	21.1	18.4	19.3
March, 1868 ...	32.6	28.8	30.	.289	.136	.216	.040	.012	.028	2830	2150	2388	21.4	18.3	19.3
<i>River Lea.</i>															
1867 ...	35.7	23.1	27.5	.382	.104	.196	.015	.000	.005	2950	230	1611	23.1	16.3	19.3
Jan., 1868 ...	36.	30.2	33.1	.147	.115	.131	.024	.014	.019	3300	2760	3030	22.8	20.5	21.6
Feb., 1868 ...	34.4	30.8	32.6	.272	.217	.244	.037	.026	.031	3400	3240	3320	20.5	20.5	20.5
March, 1868 ...	30.	27.4	28.7	.118	.059	.088	.022	.010	.016	2240	1990	2115	20.5	18.5	19.5
<i>Kent Company.</i>															
1867 ...	42.	31.8	39.3	.254	.088	.131	.004	.000	.002	4820	2890	3619	29.1	21.1	25.6
Jan., 1868 ...	...	...	44.8	...	...	.64	...	...	.013	...	...	3770	...	...	26.2
Feb., 1868 ...	...	...	59.2	...	...	.081	...	...	.013	...	...	5330	...	...	30.
March, 1868 ...	...	...	70.3	...	...	.093	...	...	.029	...	...	3680	...	...	32.3

TABLE VII.

Situation of Springs from which Bath is supplied.

Name of Company.	Situation of Springs.	Height of Reservoir above Level of Sea.
Bath Corporation	{ S. side of Charmey Down and N. side of Solsbury Hill. Reservoirs in valley between the hills.	Feet.
	a { Slope of Charlcombe Valley ...	224
	b { Summit of Lansdown, in rear of Wesleyan College ...	513
Charlcombe Company	c { Near upper end of Springfield Place ...	602
	a { From Lansdown Hill ...	420
Circus Company	b { Under Lansdown Crescent, from lower water bed ...	280
Sir James Rivers	In garden of Gay's House, Gay's Hill	250
Freeman's Company...	In road, rear of 4, Park Street ...	155
Camden Crescent	{ Rear of Nos. 13, 14, and 15, Camden Crescent ...	260
Caroline Buildings ...	Rear of Caroline Buildings ...	60
Park Street ...	In field, west of All Saints' Chapel	230
Cavendish Place ...	In shrubbery, below Somerset Place	313
Prior Park Road (Harris)	{ In garden, below Augusta Place	115
Richmond Hill	{ Side of Lansdown Road, opposite Lansdown Villa ...	490
Beechen Cliff (Mant)...	Calton Road, opposite Calton Villa	90
Beaufort ...	Rear of Beaufort West ...	105
Widcombe Crescent ...	Widcombe Crescent ...	150
Philip Street (Earl Manvers)	{ Supplied from Corporation Reservoir, Beechen Cliff ...	98
Lyncombe Place ...	Rear of Lyncombe Place ...	75

THE RIVER AND DRAINAGE.

At the bottom of the valley on each side of which the city of Bath is built flows the river Avon. This stream takes its rise about two miles W.S.W. of Acton Turville, in Gloucestershire, and runs from thence in a N.E. direction to Malmesbury, where it is joined by another stream from Tetbury. The Avon then bends to the southward, and, receiving several

brooks in its course, passes through the villages of Little and Great Somerford and Kellaways, after which it reaches Chippenham. From thence its course is S.S.W. to Melksham, and from that town nearly W. to Bradford; from thence through a picturesque valley, W., N., and S.W., to Bath. Between Melksham and Bradford it receives a small stream from Trowbridge greatly polluted with sewage and refuse from the manufactories; and at Freshford it is joined by a river which takes its rise near Bruton and flows through Frome, receiving the drainage of that town. From Bath the river proceeds in a W.N.W. direction to Bristol, and runs into the Severn about eight miles below the latter city. It will thus be seen that the Avon receives the sewage of seven towns before reaching Bath, whose aggregate population amounted in 1861 to 43,810 souls; besides several villages. All the Bath sewers open directly or indirectly into the river, consequently the greater part of the sewage of the city finds its way into it, making a common sewer of what might and should be a clear stream of water. Until some means have been devised for carrying the sewage of the towns flanking the Avon a few miles from them by special channels, and utilising it, the present condition of the river will remain, and will probably become worse; and thus a loss of valuable material be annually sustained, and the polluted state of the river render it an unsightly nuisance and a nidus for the spread of disease. An easy way of intercepting the sewage of Bath would be by carrying an iron pipe on each side of the river, commencing above the Grosvenor Suspension Bridge, and continuing to the Borough limits below Bath, into which all the sewers could be made to open. This would cause the river to be far purer than it is at present.

MR. SILLAR'S SEWAGE SYSTEM.

The Tottenham Local Board of Health, being restrained by an injunction from pouring their sewage unpurified into the Lea, have instituted a series of experiments with different processes, to ascertain which is the most efficient and least expensive mode of purification.

Irrigation was unsuccessfully tried some time ago, the failure being perhaps partly due to the inconvenient situation of the out-fall, and the necessity, therefore, of pumping to a considerable distance.

Higgs's process of precipitation with lime was also tried for a long time, but resulted in a great loss to Mr. Higgs, and was far from satisfactory as regards the quality of the effluent water. Since Mr. Higgs's death, results of the "lime process" have been still worse. The outlay being £800 per year for lime, and the residue so worthless that farmers refuse to pay its carriage when the board offer to give it them.

A new process, tried about ten days since, seems to promise well for places where it is essential that the liquid portion should flow at once into a river.

This process, which has been introduced by Mr. Sillar, consists in precipitation by a chemical compound (the formula of which is not yet made public), which appears to act far more rapidly than either alum or lime, and possesses the singular merit of precipitating nearly 85 per cent. of the ammonia contained in the sewage, and all the phosphoric acid.

The experiments at Tottenham, which were conducted by Mr. Wigner, were commenced in a tank holding 5,000 gallons. The necessary quantity of chemicals, dissolved in about 6 gallons of water, having been put in, the tank was filled with sewage; the pumping caused sufficient agitation to mix the ingredients thoroughly. The sewage (a very black sample) was immediately deodorised, and in twenty minutes a sample drawn from a tap nearly at the bottom of the tank was so clear that filtering seemed to be almost unnecessary. 4,700 gallons of this water was run off, and the tank filled again without removing the sediment, another small addition of the deodorising agent being made. This also was completely clarified in less than twenty minutes. This tank having been filled and precipitated eight times, the trial was so far deemed satisfactory, and the water having been drained closely off, the residue amounted to about 200 gallons of a thick black mud, with but little smell. This has been dried in the open air, and forms about 8 cwt. of manure, much resembling a sample of artificial manure in appearance, and containing 2.37 per cent. of ammonia.

The analysis of the water shows but little more organic impurity

than in the Tottenham water supply, and far less than in the river Lea at Tottenham.

86 lbs. of the new compound, dissolved in 50 gallons of water, were used to precipitate this quantity (nearly 40,000 gallons) of sewage. The cost is estimated at 18s. per 100,000 gallons.

A larger tank, holding 36,000 gallons, was next prepared, and the sewage allowed to flow in by gravitation at the rate of about 1,000 gallons per minute, the *solution* running in at the same time from two small tubs. Fifteen minutes after the tank was filled the mud had subsided, and the water was clear, free from odour, and almost tasteless. The greater portion of the impurity remaining in this water was common salt (the refuse, we understand, of a manufactory).

The value of the manure obtained by this process is estimated to pay all expenses, and leave a profit; and judging from the proportion of ammonia precipitated, this looks reasonable.

The ammonia in the excreta being valued at 8s. 4d. per head per annum, and the average flow taken at 26 gallons per head per day (the actual quantity at Tottenham), we shall have 9,490 gallons per head per year, giving at 18s. per 100,000, 1s. 9d. per head per year as the cost of precipitation. Again, deducting 15 per cent. of the ammonia which is left in the water, we have 7s. 1d. as the value of the manure per head per year; deducting 1s. 9d. cost of chemicals, we have 5s. 4d. as the difference, which certainly ought to pay all labour, wear and tear of plant, cartage, &c., and leave a margin.

It would be premature to assert the success of the process from these few experiments, but they are certainly sufficiently promising to justify a much more extended trial; and this, we understand, is likely to take place shortly in a town where the sewage amounts to 3,000,000 gallons per day.—*From "Engineering," July 3rd, 1868.*

MR. SILLAR'S PROCESS.

Abstract of Analyses of Sewage, &c.

		Average Sewage.	Average Water from Sewage.	Tottenham Water.
Total solid matter per gallon	...	203·89	81·96	48·70
Organic matter	... ..	109·20	14·62	11·31
Ammonia	... ..	3·97	·584	...
Phosphoric acid	... ..	7·23	...	...
Common Salt	... ..	57·10	57·51	9·21
Silica, alumina, &c., and various salts	...	30·36	9·82	28·18

Manure or Sewage Residue.

Water	...	...	...	...	4.45
Organic matter, containing ammonia,	2.37				20.05
Phosphoric acid	...	...	...	...	5.33
Sulph. lime	...	...	...	...	1.67
Silica, alumina, and various salts				...	68.50
					<hr/>
					100.00

G. W. WIGNER, ANALYTICAL CHEMIST.

In the year 1864 an alteration was effected by carrying the larger sewers into the middle of the river by large pipes, and thus preventing the escape of much noxious gas; and since my appointment as Officer of Health I have recommended the trapping with iron valves of the mouths of those of the large sewers which are not continued into the bed of the river, and which suggestion the Board of Health have had carried out. So that the evil of river drainage which exists in most cities and towns in the country, has been mitigated to a certain extent in Bath; but there is probably between St. James's Railway Bridge and Twerton a bed of sewage of many years' accumulation at the bottom of the river, the largest deposit being in the immediate vicinity of the Old Bridge. The alterations in the mouths of the sewers—they can hardly be called improvements—are only efforts to mitigate a great national misfortune, that of wasting our sewage and defiling our rivers; and I hope and believe the day will come when this evil will be done away with, and we shall see our English rivers free from pollution, the land rendered more fertile, and the country generally more healthy.

That part of Bath which is built upon the alluvial flat at times suffers severely from *floods*; more especially after the melting of the snow upon the hilly districts; and this is in no small degree enhanced by the artificial obstructions which have been raised by bridges, by encroachments on the banks

of the river, and by mill-dams or weirs, to the natural discharge of the river waters. Between Bradford and Bristol there are eleven of these weirs, one of which is in the city of Bath, and six below it. Twenty-one bridges cross the river between the same points, five of which are above Bath, the rest in the Borough and below it ; but of the latter, two are *bow-string* bridges, and cause little or no obstruction to the stream, even in the time of floods. In addition to these, the new branch of the Midland Railway crosses the river six times between Bath and Bitton, so that there are 22 bridges in or below Bath, over less than as many miles of water. Several of these have central supporting piers fixed in the middle of the river bed. The floods are more especially felt in the Dolemeads and the cottages between Grove Street and Cleveland Bridge ; but since the improvement of the Old Bridge and of the river at Twerton, they have not been so severe as in former years. Many of the houses in the Dolemeads are beneath the water level in high states of the Avon, and in floods they are inundated.

Prior to the year 1851, when the Corporation obtained the "City of Bath Act," there was no plan of the city for proper levels for building, sewage, or other structural purposes. For the out-parish of Walcot there were Commissioners who had powers, under a Local Act, to construct sewers ; but their jurisdiction extended only to about one-fifth of the city, and for the remainder there was a total absence of public powers for drainage and sewage. Since the year 1851, a great number of new sewers have been laid out, and these are delineated on maps kept at the Guildhall ; the old sewers are also marked as frequently as they are discovered. There is on an average one sewer to every street, and some streets have two or three, so that the number of miles of sewers in the Borough is very considerable. In the following localities new stoneware pipe sewers, 9 inches in diameter, have been laid down, and their course marked in the Guildhall maps :— Behind Sion Row, pipe sewer joining with one from Cranhill Dairy, the united sewer running beneath road on north side of Kilkenny House. One on each side of Sion Row. Back

of Sion Place, from thence down centre of carriage road, Sion Hill, joined by one from Sion House and one from Winifred Lane. Behind Springfield Place. Back of Lansdown Creseent—two united, running east and west. Pipe sewer from Riehmond Place (east end), down Riehmond Road, joining Springfield Place sewer 150 yards below St. Stephen's Church. Baek of Upper Midsummer Buildings to Woreester Villas and Woreester Buildings, *over* the brook at the bottom, where it joins another 9 inch pipe sewer from Niagara Cottage; united sewer runs towards Larkhall, joining one from Cottage Place. Back of Eldon Place, joining the last, 100 ft. S.E. of Niagara Cottage. Centre of Brunswick Street. Ashler sewer, 20 in. \times 28 in., runs W.S.W. under pavement of Piccadilly Place and onward; further course not discovered. Pipe sewer at back of Claremont Buildings; baek of Cottage Place, Larkhall. Ashler sewer in front of Somerset Buildings, 20 in. \times 28 in. Pipe sewer, 15 in., from baek of 34, Paragon, under 5, Cornwell Buildings, into main sewer in Waleot Street (?), joined by a 9 in. pipe sewer from 13 to 6, Cornwell Buildings.

Main City Sewer.—Oval, 32 in. \times 4ft., comes from direction of Russell Street, running under 5, St. Andrew's Terrace, and 8, Edgar Buildings, down centre of Milsom Street to the bottom, where a branch turns down Quiet Street, Queen Street, Trim Street, New Westgate Buildings, Seven Dials, down the centre of Avon Street, to the river. Main sewer proceeds down Burton Street, Stall Street, and Southgate Street, to the river on west side of the Old Bridge; it conveys the waste water from the baths and springs. East side of Philip Street, 9 in. pipe sewer on both sides of houses. Centre of Margaret's Buildings. Upper Bristol Road, at bottom of Marlborough Lane. Devonshire Buildings. Baek of Beechen Cliff Place. Behind Augusta Place and Forefield Place, Wideombe Parade, Bolwell's Buildings, along Calton Road, and down Lyncombe Hill. Behind Regent Terraece, Farmer's Buildings, Farmer's Terrace, Petersburg Place, Ferry Place, and Charles Place. Centre of Pulteney Street, Daniel Street, in front of Old

Sydney Place, and centre of Bathwick Street (stone), Cottage Row, Cleveland Walk, and North Road, each side of Dunsford Place, and along Cambridge Terrace. In December, 1868, a large and very ancient stone sewer was discovered running from the east end of St. Michael's Place, in front of the Cross Bath, towards Hot Bath Street and Hetling Court. It conveys the waste water from some of the baths and springs, and probably formerly ran into the City Ditch, on west side of Hetling House and Hetling Gardens, now Hetling Court.

It would appear that when Queen Elizabeth visited Bath there was no common sewer ; and this city, now large and handsome, is represented to have been a poor place in 1670. The old sewers are chiefly rectangular, the house drains from 6 in. square to about 12 in. by 10 in., main sewers from about 12 in. by 14 in. to 2 ft. by 4 or 5 ft., the prices varying accordingly, a drain of 12 in. by 14 in. costing about 3s. per foot running measure. The new sewers consist of glazed stoneware pipes, of diameters varying from 6 to 18 inches, and costing from 4d. to 2s. 6d. per foot, according to size. When the main sewers require cleansing they are opened from the surface and the deposit taken away. With the exception of the alluvial flat at the bottom of the valley, the ground upon which the city stands affords great natural facilities for drainage, and this has been taken advantage of. The surface drainage is, as a rule, fairly good, and many parts of the city are well sewered. The streets are kept fairly clean, and are well lighted with gas. The pitching and paving are better than in many cities of larger size than Bath, but there is room for considerable improvement under this head. The scavenging is performed by a contractor, who removes the refuse from houses and buildings once or twice a week to a depôt in the environs, where it is sorted, and much of it carried away into the country and sold for manure. Avon Street is swept and cleansed every day.

Taken as a whole, Bath may be regarded as a well-built city ; the streets are generally airy and good, the chief exceptions being in the lower and older parts, yet in these localities some remarkably fine houses are to be found—remnants of grander

times gone by. In the North Parade Buildings, Chandos Buildings, Westgate Buildings, St. John's Place, and St. James's Parade, several houses may be seen whose size, lofty rooms, and wide oak staircases contrast strangely with the poverty and dirt of the inmates. Courts and alleys are not very frequent, but short streets and little rows of cottages abound in the Dolemeads and some parts of Widcombe and Walcot. Indeed, the system of naming short rows of buildings in the same line by different appellations is carried to an absurd extent in Bath, for although there are several instances of long lines of houses, yet there are only two streets having more than 70 houses actually numbered in continuity. This plan, which till lately obtained largely in London, has been greatly remedied there by grouping houses in one line into a street with one name, and the same might be done with advantage in Bath.

Milk Street, Avon Street, and Corn Street, the abodes of the poorest classes, are fairly wide streets; the houses in them are usually dirty and ill-ventilated, though much has been lately done to improve their condition in this respect, and the streets themselves would be regarded, in towns where good streets are not so prevalent, as sufficiently wide, and all are well lighted and fairly paved. The evil in modern times has been the erection in the Dolemeads of a very poor description of houses, which are inhabited by the poorest classes. The district is very low, being but a few feet above the level of the river in its ordinary state, and in times of flood the majority of the cottages are inundated to a greater or less extent, the drains giving the water access to the houses, and therefore aiding in the inundation. The ventilation of the poorer houses is in many cases bad and neglected, but there are no cellar dwellings, and the schoolrooms for the labouring classes are fairly constructed, and many of them have playgrounds; their site, drainage, light, warmth, and ventilation are fairly good. The houses are better warmed than in most towns, coal abounding in the neighbourhood, and being comparatively cheap.

The *manufactories* in the city are not numerous, Bath being

more a place of fashionable resort and for invalids requiring the Mineral Waters ; consequently there are no high chimneys, nor is there much smoke. In both respects it presents a contrast to the sister city of Bristol, and to others in the North of England ; but it is, nevertheless, a fact that the death rate of some cities and towns where manufactories are numerous and black smoke abounds, is found to be lower than in others that have neither of these.

LODGING HOUSES.

There are eight Lodging Houses licensed by the Board of Health, and subject to regulations and a frequent inspection by the Inspector of Nuisances. In the next Table is given a list of these houses and their general condition, and it should be stated that Nos. 1 and 8 are not adapted for the purpose for which they are used—the first being an old dilapidated building with small confined rooms, and a rickety staircase ; and the second is scarcely fitted for human habitation.

Upon visiting the first eight of these after my appointment in 1866, I found them in a very unsatisfactory state ; there were at that time two others which have since been closed. One of these, situated at 17, Avon Street, was a disgrace to the city, and I was surprised that the house had been allowed to remain in its then condition for so long a time. The general state of the houses is now tolerably good ; they are whitewashed twice a year, and the floors frequently washed ; the bedding is kept much cleaner, and the water supply of good quality and abundant, excepting to No. 8.

No. 9 on the list is an Institution for Tramps, called “ The Refuge,” managed by a committee of gentlemen and not licensed, and may be taken as a model lodging house. It is kept scrupulously clean, the rooms are well ventilated ; the tramps upon their arrival are provided, free of charge, with warm water for washing, a supper, and a clean bed, and on the following morning with breakfast, after which they are required to quit the city. It need scarcely be said that most of the tramps arrive at this and the other lodging houses in a state of poverty, squalor, and dirt that should be seen to be

TABLE VIII.
Lodging Houses, Licensed.

No.	Locality.	Number of Persons Licensed for.	Number of Bedrooms.	Number of Sitting Rooms.	Ventilation.	Drainage.	Water Supply.	Closest Accommodation.	Name of Proprietor.
1	3, Avon Street ...	33	7	1	Bad	Good	Good	1 W.C.	Warren.
2	9, Avon Street ...	35	6	1	Fair	Fair	Good	1 W.C.	Phillips.
3	34, Avon Street...	23	4	1	Fair	Fair	Good	1 W.C.	Dyer.
4	78, Avon Street...	25	6	1	Good	Good	Good	1 W.C.	Packer.
5	81, Avon Street...	17	4	1	Indifferent	Good	Good	1 W.C.	Smith.
6	84, Avon Street...	32	6	1	Good	Good	Good	1 W.C.	Pierano.
7	7, Milk Street ...	21	6	1	Indifferent	Fair	Fair	1 W.C.	Sainsbury.
8	19, Little Corn St.	14	3	1	Bad	Bad	None	1 W.C.	Marsh.
		not licensed.							
9	7, Abbey Green...	19	4	1	Good	Good	Good	1 W.C.	Priv. Committee.

believed, and this will be again adverted to in relation to an outbreak of typhus at the Refuge in 1864.

The total number relieved at this institution in the year 1865 was 4,203, and the probable number who sleep in each of the lodging houses every night varies from 4 to 6, so that taking the number at 5, about 40 vagrants would on the average sleep in these houses per night ; and supposing that each one may sleep two nights in the lodging houses, it follows that $7300 + 4203 = 11,503$ vagrants sleep in these establishments per annum. Making every allowance for the same parties visiting Bath more than once during the year—still, considering that many only remain one night, the number of different vagrants who visit the city must be very considerable. They are most numerous during “the season,” and are especially augmented during the race week, and it is to be feared that indiscriminate charity somewhat prevails. A large proportion of these vagrants are of the worst kind, and they pay about 3d. per night for their beds in the licensed lodging houses.

SLAUGHTER HOUSES.

In July, 1867, I presented a Report to the Board of Health upon these establishments, of which, at that date, there were 53. The number is now (Jan., 1869) the same ; they are all licensed by the Board, and are subject to a very frequent inspection by the Inspector of Nuisances. Thirty-one of them are situated within a comparatively small compass, and mostly in the heart of the city, viz. :—Westgate Place, Parsonage Lane, Boatstall Lane, Avon Street, Peter Street, Back Street, Broad Street, and beneath the Potato Market. The others are more separated from these and from one another, the localities being Margaret’s Buildings, Northampton Buildings, Belvedere, Bridge Place, Claverton Buildings, Villa Fields, Walcot Buildings, Larkhall, &c. It therefore appears that these buildings are scattered over the Borough in nearly every direction, and that there are but few parts, and these chiefly in the higher localities of the city, that have not one or more slaughter houses in their vicinity. They are mostly situated

in more or less densely populated neighbourhoods, a great proportion being at the rear of, or closely adjoining to, the butchers' shops. In no instance is there a greater distance than 80 yards between a slaughter house and the nearest dwelling house, and in some they adjoin and are surrounded by dwelling houses. Until April, 1868, the bye-laws regulating them were defective and inefficient; but at that date more stringent and effective regulations, which had been framed by the Board of Health at my suggestion, received the sanction of the Recorder of Bath and of the Home Secretary, and many previous evils will now, it is hoped, be remedied. It is a matter for regret that any slaughtering takes place in the city. In several towns in England the slaughter houses are abolished, and public abattoirs erected out of the town. This is the case at Weston-super-Mare, Newport (Mon.), Reading, and Plymouth; and I hope the day is not far distant when the good example set by these towns will be followed by the city of Bath.

The practice of keeping *pigs* in the city prevailed before my appointment to a large extent, and some difficulties were experienced in causing these highly objectionable animals to be removed, partly from local prejudice, and partly from opinions differing as to their being detrimental to the public health. There can be no doubt that pigs in cities, and especially in crowded localities, *are* injurious to health, and should not be suffered to remain. The exhalations from the styres and from the food—more particularly when the animals are fed upon offal and blood—are highly mischievous and hurtful. Large numbers of pigs have been removed from Avon Street, Milk Street, and other crowded parts of the city, and they are forbidden *in* the slaughter-houses. In Bristol they are not allowed to be kept, and this ought to be made compulsory in Bath.

POPULATION AND HOUSE ACCOMMODATION.

At the Census of 1841 the population of the Borough of Bath was 53,206, of which 22,335 were males, and 30,871 females. In the next Table are given the results of the Census of 1851 and 1861.

TABLE IX.
Population.

Parishes.	Persons.		Males.		Females.	
	1851.	1861.	1851.	1861.	1851.	1861.
St. James	5,861	5,788	2,478	2,468	3,383	3,320
St. Michael ...	3,022	2,951	1,291	1,235	1,731	1,716
St. Peter & Paul	2,764	2,347	1,213	1,012	1,551	1,335
West Walcot...	15,322	15,008	5,542	5,356	9,780	9,652
East Walcot ...	12,135	11,268	4,949	4,553	7,186	6,715
Lyncombe & } Widcombe }	9,974	9,900	4,417	4,350	5,557	5,550
Bathwick	5,162	5,266	1,839	1,762	3,323	3,504
Total	54,240	52,528	21,729	20,736	32,511	31,792

In the year 1851 there was an *increase* of population in the Borough as compared with 1841 of 1,034. In the year 1861 there was a *decrease* as compared with 1851 of 1,712. So that in 20 years there was a decrease in the population of 678. In the Registrar-General's Quarterly Return for the Autumn Quarter of 1868, the population of Bath was estimated for the middle of that year at 53,246, or an increase since the last Census of 718.

The population of Bath is, however, subject to annual variation in consequence of a considerable number of persons making it a winter residence, and leaving in the summer for other localities. Various conjectures have been made as to the amount of decrease in the population during the summer months, and some estimates must be far wide of the mark. I am of opinion that the decrease does not in the average of years exceed 2,000, for although many residents and visitors leave the city in the warm weather, yet Bath is visited by tourists and others at that time, who compensate in some degree for the efflux. The Census is usually taken in March or April, when the population is above the average.

According to the following Table there were, in 1861,

$6\frac{1}{2}$ persons to each house. The gross increase of houses in seven years is about 877, and if the estimated population in the middle of 1868 be correct (53,246), there are about 5.6 persons to each house (including void houses).

TABLE X.
House Accommodation; from the Census Returns.

Parishes.	Area in Statute Acres.	APRIL, 1861.			SEPTEMBER, 1868.			Increase or Decrease of Inhabited Houses.	Increase or Decrease of Void Houses.
		Houses.			Houses.				
		Inhabited.	Void.	Building	Inhabited.	Void.	Building		
St. James	<i>a</i>	630	55	...	676	27	...	+ 46	- 28
St. Michael	<i>a</i>	436	59	...	*524	30	...	+ 88	- 29
St. Peter & Paul ...	<i>a</i>	322	51	1	*400	*20	1	+ 78	- 31
West Walcot	<i>a</i>	2,094	125	2	} 4720	200 {	2	} + 642	+ 10
East Walcot	<i>a</i>	1,984	165	9			5		
Lyncombe & Wid- combe	1,845	1,715	97	10	1,895	105	12	+ 180	+ 8
Bathwick	573	836	28		862	15	2	+ 26	- 13
Total	13,250	8,017	580	22	9,077	397	22	+ 1060	- 83

a The areas of the parishes of St. James, St. Michael, St. Peter and Paul, and Walcot are estimated together at 10,832 statute acres.

* These figures represent the *rateable property*, and include a small number of stables, warehouses, &c.

BIRTHS, MARRIAGES, AND DEATHS.

In the year 1846 the "Bath Health of Towns Association" was founded, the objects of the society being threefold:— "To diffuse information among the inhabitants of Bath respecting the physical and moral evils that result from defective sewerage, drainage, supply of water, air and light, and the mal-construction of dwelling-houses;" "to investigate the condition of the city of Bath in these respects;" and "to correct the evils by the best possible means." The Association issued two reports, but does not appear to have lasted for any length of time. From the second report I extract the valuable Table at page 34 on the mortality of the *Borough of Bath* during the septennial period 1838-1844, drawn up by Mr. Frederick Field.

In Table XIII. the number of the Births, Deaths, and Marriages are given in the Bath Registration District (excluding Batheaston and Twerton) for the decennial period 1851 to 1860. It must, however, be remembered that the sub-district of Bathwick includes the parishes of Claverton, Bathampton, and Monckton Combe, which I found impossible to eliminate from that return.

TABLE XI.

Deaths and Death Rate from 1856 to 1860, inclusive, in the Borough of Bath.

Year.	No. of Deaths.	Death Rate per 1,000.
1856	1,074	19·9
1857	1,159	21·3
1858	1,482	27·3
1859	1,289	23·7
1860	1,244	22·9

In Table XV. are given the Births, Deaths, and Marriages in the *Borough of Bath* from 1861 to 1866.

TABLE XII.

Sub-districts.	1838.	1839.	1840.	1841.	1842.	1843.	1844.	Average mortality per 1,000 of the Bo- rough of Bath for the seven years, 1838-1844, 25·5.
Abbey ...	356	354	379	402	299	307	322	
West Walcot ...	308	309	346	308	338	338	319	
East Walcot ...	281	271	378	290	285	263	276	
Lyncombe & Widcombe ...	233	287	381	320	286	282	329	
Bathwick Parish ...	74	91	119	99	87	110	110	
Total ...	1,252	1,312	1,603	1,419	1,295	1,300	1,356	
Population Census 1841, 53,209								
Death rate per 1,000 ...	23·5	24·6	30·1	26·6	24·3	24·4	25·5	

TABLE XIII.

Sub-Districts.	Population.		Births.	Marriages.	Deaths.	Excess of Births over Deaths.	Increase or Decrease of Population according to Census Return.
	1851.	1861.					
Abbey ...	11,647	11,086	2,996		3,129	-133	-561
West Walcot ...	15,322	15,008	3,229		2,940	289	-314
East Walcot ...	12,135	11,628	3,039		2,489	550	-867
Lyncombe and Widcombe ...	9,974	9,900	2,852		3,042	-190	-74
Bathwick ...	6,943	7,132	1,430		1,193	237	+189
Total ...	56,021	54,754	13,546	6,314	12,793	+753	-1,627

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TABLE XIV.

Abstract of Deaths from all causes, at different Ages, from 1851 to 1860.

Sex.	Under 1 year.	1 Year.	2	3	4	Total under 5 years.	5	10	15	20	25	35	45	55	65	75	85 and upwards	Total.
Males. ...	1,532	432	239	129	106	2,438	239	152	166	214	457	537	647	724	775	625	163	7,137
Females ...	1,217	408	226	135	90	2,076	251	177	250	255	536	557	629	809	1151	1023	373	8,087

This Table and the next include the whole Registration District of Bath, comprising the parishes of Batheaston and Twerton in addition to those in Table XII.

TABLE XV.

Deaths at all Ages, with the causes, 1851-1860.

Causes of Death.		Males.	Females	Total.	Causes of Death.		Males.	Females	Total.
Small Pox	...	110	88	198	Diseases of the Brain	...	904	990	1,894
Measles	...	77	76	153	" Heart, Dropsy	...	423	602	1,025
Scarlet Fever	...	123	118	241	" Lungs	...	1,091	1,209	2,300
Diphtheria	...	16	16	32	" Stomach & Liver	...	337	474	811
Whooping Cough	...	90	127	217	" Kidneys	...	158	76	234
*Typhus Fever	...	230	274	504	" Generative Organs	...	3	50	53
Cholera, Diarrhoea, Dysentery...	...	326	298	624					
Other Zymotic Diseases	...	291	251	542	Diseases of the Joints	...	40	44	84
					" Skin	...	17	26	43
Cancer	...	81	244	325	Childbirth and Metria	...	...	83	83
Scrofula, Tabes Mesenterica	...	157	157	314	Violent Deaths	...	308	191	499
Pulmonary Consumption	...	902	931	1,833	Other causes	...	1,310	1,647	2,957
Hydrocephalus	...	143	115	258	Total	...	7,137	8,087	15,224

* Probably the larger proportion of these cases were *Typhoid* fever.

TABLE XVA.

Deaths in the Quarter ended	Abbey.	Walcot.		Lyncombe and Widcombe.	Bathwick.	Total.	Death Rate per 1,000.	Births.	Marriages.
		West.	East.						
31st March, 1861	83	76	60	71	21	311			
30th June, "	74	76	56	71	30	307			
30th Sept., "	77	67	46	64	21	275			
31st Dec., "	67	70	51	54	22	264			
Total ...	301	289	213	260	94	1,157	22·0	1774	631
31st March, 1862	97	105	70	81	23	376			
30th June, "	75	60	56	64	16	271			
30th Sept., "	55	57	46	43	17	218			
31st Dec., "	75	67	56	76	20	294			
Total ...	302	289	228	264	76	1,159	22·0	1373	673
31st March, 1863	58	83	70	82	28	321			
30th June, "	73	72	43	71	31	290			
30th Sept., "	87	57	51	81	30	306			
31st Dec., "	103	82	58	71	32	346			
Total ...	321	294	222	305	121	1,263	24·0	1351	661
31st March, 1864	115	127	86	86	20	434			
30th June, "	84	75	85	83	16	343			
30th Sept., "	92	75	65	82	15	329			
31st Dec., "	82	83	67	79	23	334			
Total ...	373	360	303	330	74	1,440	27·4	1346	701
31st March, 1865	112	93	64	102	35	406			
30th June, "	93	79	70	84	25	351			
30th Sept., "	69	58	58	82	21	288			
31st Dec., "	69	60	49	92	16	286			
Total ...	343	290	241	360	97	1,331	25·3	1825	647
31st March, 1866	102	104	74	88	30	398			
30th June, "	83	84	65	77	28	337			
30th Sept., "	59	45	47	56	17	224			
31st Dec., "	65	58	57	70	22	272			
Total ...	309	291	243	290	97	1,230	23·4	1700	654

The death rate of the *Registration District* of Bath for the decennial period 1851 to 1860 was 21 per 1,000. The death rate of the *City and Borough of Bath* for the six years 1861 to 1866 was 24 per 1,000. Of the United Kingdom (population estimated in 1866 at 21,210,000) 22·8 for the same period.

In the next Table a synopsis of the causes of death is given from 1861 to 1866 in the *Registration District of Bath*.

TABLE XVI.
Causes of Death.

Year.	Small Pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping Cough.	Typhus Fever.	Erysipelas.	Cholera.	Diarrhoea.	Consumption.	Diseases of the Respiratory Organs.	Childbirth and Metria.	Violent Deaths.	Other Causes.
1861	0	31	4	3	16	37	4	1	79	157	212	6	46	841
1862	0	1	7	9	37	44	4	2	46	136	256	14	56	775
1863	2	35	119	11	29	48	9	0	50	147	189	6	50	833
1864	7	9	275	14	18	46	10	0	48	148	252	8	70	906
1865	106	32	33	6	4	38	3	0	54	165	238	12	66	871
1866	3	17	9	5	15	30	3	1	67	157	299	11	62	844

TABLE XVII.

Year.	Deaths from Sporadic* Causes.	Deaths from Zymotic† Causes.	Total Number of Deaths		Per centage of Deaths from Zymotic to Total Causes.	Chief Zymotic Diseases Prevalent.
			City and Borough.	Registration District.		
1861 ...	1262	175	1157	1437	14	Diarrhoea.
1862 ...	1237	151	1159	1388	8	+Typhus Fever, Hooping Cough.
1863 ...	1219	303	1263	1522	20	+Typhus, Scarlet Fever, Measles.
1864 ...	1384	427	1440	1811	27	+Typhus, Scarlet Fever.
1865 ...	1352	276	1331	1628	19	Small Pox.
1866 ...	1373	150	1230	1523	11	Diarrhoea.

* By the term *Sporadic* is meant a disease which occurs in single and scattered cases, in distinction from an epidemic and endemic, which affect many persons at the same time.

† By the term *Zymotic* is meant the entire class of epidemic, endemic, and contagious diseases.

‡ Probably some were cases of *Typhoid* Fever.

TABLE XVIII.

The Weather and the Death Rate, 1861—1866.

Year.	Mean height of Barometer.	Mean Temperature.	Amount of Rainfall.	Birth Rate.	Death Rate.	Epidemics prevailing.
	In.	Degrees.	In.	Per 1000	Per 1000	
1861	29·807	47·9	34·02	32·6	22·	None.
1862	29·852	48·3	48·19	25·2	22·	None.
1863	29·600	53·1	37·95	24·9	24·	Scarlet Fever, Measles.
1864	29·489	47·1	19·62	24·9	27·4	Scarlet Fever, Diarrhœa.
1865	29·492	50·1	28·15	33·6	25·3	Small Pox.
1866	29·771	53·6	36·75	31·2	23·4	None.

It will be observed in the above Table that in proportion as the mean height of the barometer fell, so the death rate rose, and *vice versa*.

HEALTH AND AVERAGE AGE OF INHABITANTS.

Properly to estimate this subject it should be borne in mind that Bath is a place of much resort for persons in easy conditions of life (amongst whom females prevail), who reside in good houses, and for the most part in well-ventilated streets or crescents, and ranges of buildings well exposed to the sun and winds, especially to the mild and prevalent southerly and westerly breezes. Not only is this predominance of females due to those in good circumstances who make Bath their residence, but to the number of maid-servants employed in the different families. On examination of the population returns since 1801, it would appear that in that year the proportion of females to males was as 1·5 to 1, or 30 to 20; in 1811 the same; in 1821 as 1·4 to 1, or 28 to 20; in 1831 the same; in 1841 as 1·38 to 1, or about 27 to 20; in 1851 as 1·48 to 1, or 30 to 20; and in 1861 as 1·6 to 1, or 32 females to 20 males.

When it is considered that out of a population of 52,528 (Census of 1861), 31,792 were females, of whom a large proportion were not born in Bath, but came to reside in the city—many in advanced life and many in its prime; that a considerable number of males have also become residents at a mature age; and that so large a proportion of the population is amongst the easy classes, well lodged and fed, receiving every attention in sickness—their servants also for the most part withdrawn from many of the causes of disease to which the poorer classes are usually exposed—it is not surprising that the city bears a fair character for the healthiness of the inhabitants. The charitable institutions for the relief of the sick poor are numerous. The Royal United Hospital, the Eastern, Southern, and Western Dispensaries, are the principal ones, and the Borough is divided into four districts, the sick poor of which who are unable to leave their homes are attended from these institutions, provided they obtain a recommendation from a subscriber. In the case of the United Hospital this rule is not enforced. The Dispensaries and the Hospital are open daily for out-patients who are able to leave their homes, and the Hospital contains 120 beds. Persons are admitted to it as in-patients from Bath and a district round of about 20 miles radius, except in the direction of Bristol. In addition to these institutions a considerable number of the poor are visited as paupers by the medical officers of the Bath Union districts, so that the facilities for obtaining medical relief by the poorer classes in this city are unusually ample, as will be seen in Table XIX.

Total of persons treated at all the Bath institutions during six years, according to this Table, 140,622; or 23,437 per annum receiving gratuitous medical relief. This is not, of course, a fair statement of the actual amount of illness in the city, inasmuch as a very considerable proportion of these cases come from the environs of the Borough, and from the neighbouring villages and towns, and not a few of the patients apply at the institutions for trifling complaints.

TABLE XIX.

Patients Treated at the Bath Institutions, from 1861—1866.

Year.	Royal United Hospital.		In Patients only.	Out Patients only.			*	
	In Patients.	Out Patients.		Eastern Dispensary.	Southern Dispensary.	Western Dispensary.	Poor Law Medical Relief.	Other Institutions
1861...	1,325	10,409	524	3,516	761	1,310	2,634	2,346
1862...	1,139	11,275	527	2,815	739	1,259	2,689	2,175
1863...	1,025	11,151	471	3,247	739	1,212	2,572	2,787
1864...	1,151	10,763	625	4,117	741	1,239	2,848	3,025
1865...	1,152	11,003	631	3,893	700	1,259	3,047	2,389
1866...	1,012	10,426	619	3,227	702	1,369	2,733	2,304
	6,804	66,027	3,397	20,815	4,382	7,648	16,523	15,026

* Including the Workhouse.

INTERMENTS.

These are now almost exclusively *extra-mural*. There are several old grave yards in the Borough which are closed, and there are others belonging to different sects in which interments are rare or altogether forbidden, except where family vaults are occasionally opened. Cemeteries, some of them of large size, have been laid out at various dates since 1844 in different localities round the city for the various Borough parishes. Seven of these now exist. (Table XX.)

TABLE XX.

Name.	Description.	Situation.	Date of Inter-Opening. ments to 1867.	Number of Inter-Opening. ments to 1867.	Remarks.
Abbey	Cemetery	Perrynead ...	1844	1890	Not well situated
Lansdown	"	Summit of Lansdown	1848	1352	Badly situated
Roman Catholic	"	Above Perrynead	1859	314	Not well situated
Lyncombe and St. James	"	Lower Bristol Road	1862	1928	Well situated
St. Michael	"	Upper Bristol Road	1862	183	Fairly situated
Walcot and St. Saviour's	"	Locksbrook ...	1864	1567	Fairly situated
Bathwick	"	Smallcombe Vale	1856	287	Fairly situated
St. James	Grave Yard	Lower Borough Walls	a	b	Badly situated—closed
St. Michael	"	Walcot Street ...	a	b	Badly situated—closed
Walcot ...	"	(2) Cornwell Buildings	a	b	Badly situated. Both closed except for opening vaults.
Bathwick	"	(2) Bridge Road and Vane St.	1814	b	As next above
Widcombe	"	Church Street, Widcombe	a	b	As next above
St. Mark's	"	St. Mark's Place ...	1832	b	As next above
Abbey	"	In the Nave of the Church	a	b	Closed
St. Saviour's	Vaults	Under the Church	1832	310	Rarely used
Walcot ...	"	Under the Church	a	b	Rarely used
" James	Crypt	Between 37 & 38, Paragon	1841	56	Rarely used
St. Michael	Vaults	Under the Church	a	b	Rarely used
Independents'	"	Under the Church	a	b	Rarely used
Baptists'	Grave Yard	Snow Hill	a	930	Closed except for opening vlt.
"	"	Snow Hill	a	b	Closed
"	"	Lyncombe Hill ...	a	b	Closed
Friends' ...	"	Below Widcombe Crescent	a	b	Occasionally used
Unitarian	"	Lyncombe Vale ...	a	b	Occasionally used
Lady Huntingdon's	"	Julian Road ...	a	1773	Occasionally used
Moravian	"	Weston Lane ...	a	b	Rarely used
Jews' ...	"	Combe Down ...	a	b	Occasionally used

a These dates cannot be ascertained with certainty; and it would be next to impossible ascertain the number of interments in the grave yards and vaults marked b.

Cemeteries and grave yards should not be laid out on hills or above houses, but on low grounds as near the lowest level of a valley as practicable, in order that springs and water-courses, from which water is obtained for potable purposes, may not be polluted. The situation of the Lansdown Cemetery has been adverted to in a previous section.

TABLE XXI.

Average Price of Provisions, and the Death Rate,
1861-1866.

Quarter Ended	Wheat per Quarter.		Potatoes per Ton.		Beef per lb.	Mutton per lb.	Death Rate of Bath.
	<i>s.</i>	<i>d.</i>	<i>s.</i>	<i>d.</i>	<i>d.</i>	<i>d.</i>	per 1,000
31st March, 1861.	55	1	147	6	5 $\frac{1}{4}$	6 $\frac{1}{2}$	22.2
30th June, „	54	9	130	0	5 $\frac{1}{2}$	6 $\frac{1}{4}$	22.2
30th Sept., „	52	1	97	6	5 $\frac{1}{2}$	6	20.9
31st Dec., „	59	3	120	0	5 $\frac{1}{4}$	5 $\frac{3}{4}$	20.9
31st March, 1862.	60	1	142	6	5 $\frac{1}{4}$	5 $\frac{1}{2}$	28.6
30th June, „	56	8	190	0	5	6	20.9
30th Sept., „	56	10	115	0	5 $\frac{1}{4}$	6	16.6
31st Dec., „	48	2	100	0	5 $\frac{1}{4}$	6	22.2
31st March, 1863.	46	7	125	0	5	6	24.4
30th June, „	46	2	120	0	5 $\frac{1}{4}$	5 $\frac{3}{4}$	22.2
30th Sept., „	45	7	87	6	5 $\frac{1}{4}$	5 $\frac{3}{4}$	25.2
31st Dec., „	40	6	70	0	5 $\frac{1}{4}$	6	26.3
31st March, 1864.	40	4	62	6	5 $\frac{1}{2}$	6 $\frac{1}{4}$	33.1
30th June, „	39	7	50	0	5 $\frac{1}{4}$	6 $\frac{1}{4}$	26.2
30th Sept., „	42	3	100	0	5 $\frac{1}{4}$	6 $\frac{1}{4}$	25.0
31st Dec., „	38	5	87	6	5 $\frac{3}{4}$	6 $\frac{1}{4}$	25.2
31st March, 1865.	38	4	91	0	5 $\frac{3}{4}$	6 $\frac{1}{4}$	30.8
30th June, „	40	6	102	6	5 $\frac{3}{4}$	7 $\frac{1}{2}$	26.5
30th Sept., „	43	3	85	0	5 $\frac{3}{4}$	7 $\frac{1}{2}$	22.2
31st Dec., „	44	10	75	0	5 $\frac{1}{2}$	7	22.1
31st March, 1866.	45	6	72	6	5 $\frac{1}{2}$	6 $\frac{1}{2}$	30.2
30th June, „	46	6	77	6	6	7	25.3
30th Sept., „	51	0	97	6	6 $\frac{1}{4}$	6 $\frac{3}{4}$	16.9
31st Dec., „	56	8	107	6	6	6 $\frac{1}{2}$	20.9

EPIDEMICS.

“Epidemics appear to be generated at intervals in unhealthy places, spread, go through a regular course, and decline, but of the cause of their evolutions no more is known than of the periodical paroxysms of ague. The body, in its diseases as well as its functions, observes a principle of periodicity, its elements pass through prescribed cycles of changes, and the diseases of nature are subject to similar variations. If the latent cause of epidemics cannot be discovered, the mode in which it operates may be investigated, and the laws of its action may be determined by observation, as well as the circumstances in which epidemics arise, or by which they may be controlled.”—*Dr. Farr.*

In treating this subject I propose to notice as concisely and as accurately as possible the chief epidemics which have appeared in Bath during the last 100 years, and it should be stated that in this city they rarely attain to great severity, and their duration is brief.

INFLUENZA, 1782.

The first epidemic of which I have been enabled to find any account was one of *Influenza* which occurred in May and June, 1782, recorded by Wm. Falconer, M.D., F.R.S. It prevailed previously in London, and spread over most parts of the kingdom, and attacked all persons indiscriminately, all ages and both sexes, but seldom proved fatal, except to some very old persons. No account is given of the number of persons attacked.

INFLUENZA, 1803.

The second was also one of *Influenza*, which appeared about the middle of February, 1803, and was, perhaps, the most widely diffused through England of all previously recorded visitations. It was preceded by epidemic diarrhoea, and the symptoms presented much bilious derangement and affection of the head—bleeding from the nose often interchanging with scarlet fever or superseding it. Low fever was subsequently prevalent. *Meteorological Coincidences*: North-east winds, fetid acrid fogs, Aurora borealis, sudden atmo-

spheric changes, shocks of earthquake, excessive mortality amongst insects, and disease of cattle and domestic animals. Dr. William Falconer, who wrote an account of this epidemic, states that he was unable to say what proportion of people in society were attacked. A large number were certainly affected, and it appeared to make no distinction in age, sex, habit of body, or state of health. Four out of five patients in the General Hospital were seized by it. The Register of Funerals showed 306 deaths—St. Peter and St. Paul, 16 ; St. James, 67 ; St. Michael, 37 ; Walcot, 186. Total, 306.

CHOLERA, 1832.

In July, 1832, Bath was visited by an epidemic of *Asiatic Cholera*, which continued till the middle of October, and attacked 74 persons, of whom 49 died and 25 recovered. In all probability this epidemic was introduced from Bristol by a hawker, and it selected the lower part of the city and the worst and most crowded streets for its attacks. Thus, in Avon Street there were 33 cases. The first house in which it appeared in this street was No. 27, in which five persons lived. Four of these died of cholera in a very short space of time ; the fifth escaped and left the house, after which it was thoroughly cleansed and lime-washed, and taken by the Board of Health as a cholera hospital. Thirteen cases occurred in the Lower Bristol Road (nearly all in Oak Street), five in the Dolemeads, four in Grove Street, four in Milk Street, three in Gibbs's Court, two in the New Quay (where the first case occurred), and a single case in Corn Street, Little Corn Street, Wine Street, Peter Street, St. John's Place, Kingsmead Terrace, Wells Road, Old Orchard, Dover Street, and St. James's Square. Two cases occurred in the month of July, 11 in August, 39 in September, and 22 in October. The ages of those attacked were as follows :—

TABLE XXII.

1 yr. to 5.	5-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Unknown	Recovered	Died.
8	8	11	2	5	9	4	4	3	20	25	49

Every effort appears to have been made by the authorities to check the spread of the disorder. A Board of Health was constituted and received powers from the Privy Council ; burial places for the dead were marked out, and speedy interment rendered compulsory ; whitewashing and the use of disinfectants had recourse to ; persons were stationed at the entrances to the city to watch the ingress of vagrants, and prevent their establishing themselves in it ; the bedding, clothes, &c., of persons who died or suffered from the disease were fumigated or burnt ; and means taken to insure prompt notice of the occurrence of fresh cases, and their immediate treatment. As is usually the case, the epidemic was preceded and accompanied by a minor one of diarrhœa, of which 34 deaths were registered in the same period.

INFLUENZA, 1837.

About four years and a quarter after the subsidence of the cholera epidemic, influenza again appeared in Bath with unwonted severity, and a large number of persons were attacked by it. This disorder, it appears, commenced in Sydney in October, 1836, and reached London in January, 1837, after great humidity and considerable atmospheric vicissitudes. Those most exposed to the weather were most severely attacked. The symptoms resembled those of the epidemic in 1803. The patients also complained of severe pain in the back, and there was a tendency to diarrhœa. The coincident phenomena were disease in cattle and sheep, much nervous fever, and transition in some cases to diarrhœa and cholera.

SMALL POX, 1837, 1838, 1839.

Upon the decline of influenza, *Small Pox* commenced, and when the Registration Act came into force was rapidly advancing in England. On the western side of the island it was raging at its height, and in the Bath Registration District 172 persons died between July and December, 1837. The disease continued at the beginning of 1838, but only 19 deaths occurred in Bath in that year. Signs of a second epidemic appeared at Bath in 1839, 73 deaths occurring in

that year, the largest number (30) being registered in the autumn quarter. During the three years 1837-8-9, 264 deaths occurred in the Bath district from small pox.

TYPHUS, 1837, 1838, 1839, 1840.

Typhus appears to have been very fatal in 1837, 1838, 1839, and 1840. Forty-one deaths were registered in the last half of 1837, 105 in 1838, 86 in 1839, and 115 in 1840 from this disease, of which the larger proportion—probably 80 per cent.—occurred in the Borough of Bath. It was less prevalent in 1841 and 1842.

SMALL POX, SCARLET FEVER, AND MEASLES, 1840, 1842, 1843.

In the year 1840, 97 deaths occurred from small pox in the Bath district, 72 from scarlet fever, and 90 from measles.

In the winter of 1842 small pox and measles were very prevalent in the West Walcot sub-district, and the latter disease was epidemic in the spring of 1843.

SCARLATINA, 1843.

In the autumn of this year scarlatina was epidemic throughout the city, assuming in some cases a malignant form; it continued till March, 1846. Many cases were followed by Anasarca and affections of the joints.

SMALL POX, 1845.

In the winter quarter of 1845 several cases of small pox occurred in the city, and the disease continued nearly all the summer.

MEASLES, 1846.

Measles was epidemic in 1846.

INFLUENZA, 1847.

Influenza was again epidemic in the autumn of 1847 and winter of 1847-8, but not so severely as in previous years. Twenty deaths were registered from it in the West Walcot sub-district, and 10 in the Abbey. It was most prevalent in January, 1848, and was very fatal in Batheaston.

CHOLERA, 1849.

The second visitation of cholera occurred in the summer of 1849, but was not so severe as the epidemic of 1832, and was preceded and accompanied by one of diarrhœa. The disease selected the worst part of the city for its ravages, cases happening in Little Corn Street, St. James's Parade, Wine Street, Milk Street, New Quay, Avon Street, Wells Road, Russell Place, and the Dolemeads. About 53 cases occurred; there were 3 deaths at 14, Wells Road, and 3 at 11, Russell Place. The first case occurred on 24th July, and the epidemic lasted till the end of September, and the mortality was raised 50 per cent. The number of cases of diarrhœa amounted to 70. Since 1849 there has been no epidemic of cholera in Bath.

TYPHOID FEVER, 1849.

After the subsidence of cholera, another epidemic commenced, one of typhoid fever, of which a short account was published by Dr. Davies, of Bath, and from which I gather the following particulars:—The commencement of this disease may be dated about 20th September, 1849, and it appears to have continued throughout October. Dr. Davies sent a circular to every medical practitioner in the city, soliciting information upon the cases coming under their notice. 550 cases were reported to him, and 20 of them were fatal, giving a mortality of nearly 4 per cent. It is, however, probable that there were about 650 cases of typhoid fever in the Borough, and that 40 were fatal, giving a death rate of 1 in 16, or 6 per cent. The epidemic occurred in some of the badly drained and ill-ventilated parts of the city, and in some of the opposite character. The first outbreak was spread over a circumscribed but still considerable portion of the city, and cases were selected at the same time from among the wealthy and the poor. According to the Quarterly Returns of the Registrar-General, 43 deaths were registered from typhoid fever during this epidemic in the Abbey and East and West Walcot sub-district.

TYPHUS, 1849.

From the last-mentioned source I find that there were several cases of this disease in the winter, spring, and summer quarters of this year; it was stated to have been more prevalent in the parish of Lyncombe and Widcombe than for years previously.

HOOPING COUGH, 1849.

Fifty-six deaths were registered from hooping cough in the first half of 1849, and it was epidemic in the city. This year appears to have been remarkable for the prevalence of epidemic disease.

SMALL POX, 1850.—SCARLATINA.

Small pox became epidemic in Bath in the first quarter of 1850, and continued so up to midsummer, after which it subsided, and was followed by an epidemic of *Scarlet Fever*, which was most rife in the autumn, and lasted till the middle of November.

HOOPING COUGH, 1852, 1855.—MEASLES.

In the Abbey sub-district hooping cough was very prevalent during the early part of the year 1852; and it became epidemic in the city in the winter of 1855. At this period 126 deaths were registered from all causes in the West Walcot sub-district, exceeding the births by 43, and being 30 above the average. Influenza and measles were very prevalent, and in the spring measles became epidemic.

SMALL POX, 1858.

In November, 1857, small pox made its appearance in the city. It was found necessary to open a temporary hospital, at No. 30, St. James's Parade, into which six cases were admitted; but as the disease appeared to be subsiding the house was closed on 6th Jan., 1858. All the cases admitted in 1857 recovered. On 16th January the hospital was re-opened, several fresh cases having occurred, and continued open till 29th September, when the last patient was discharged.

In 1858, 102 patients suffering from small pox were admitted, of which 93 recovered, and 9 died. Many of the cases were confluent, and the epidemic was in the main very severe. The ages of those attacked were as follows :—

TABLE XXIII.

Under 5 years.	5-10	10-20	20-30	30-40	40-50	60-70	Vaccinated.	Not Vaccinated.	Imperfectly Vaccinated.	Inoculated.	Unknown.	Recovered.	Died.
2	17	51	26	6	5	1	73	26	5	1	3	99	9
Admitted in	1857 Nov.	Dec.	Jan. 1858	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Total.
	4	2	1	0	14	20	14	20	17	12	4	0	108

The lower part of the city seems to have furnished the larger number of cases, although the disease appears to have spread over the city generally. Thus, 5 patients were admitted from St. James's Parade, 2 from Corn Street, 3 from Walcot Street, 4 from Grove Street, several from Southgate Street and its courts, and from Holloway ; whilst others came from Lyncombe Hill, Pulteney Street, Daniel Street, Worcester Terrace, Burlington Place, Portland Place, Lambridge, Milsom Street, Queen Square, &c.

TYPHOID FEVER, 1860, 1862.

Typhoid Fever has occurred in Bath on several occasions. In 1860 there was an outbreak of this disease on Bathwick Hill, of which an account was furnished in the report of the Medical Officer of the Privy Council for that year.* On the subsidence of the fever, the old sewers in this locality were taken up, and new and larger ones laid down. Of typhoid, especially, and of most disorders of the zymotic class, it may be said that the discharges which characterise the disease are likely to be its chief means of spreading infection ; and, accordingly, we find that water, impregnated

* 3rd Report Public Health, page 8.

with the fever poison, from sewage matter, is the most common cause of the spread of typhoid. Many instances of this have occurred in this city, and the fact shows the danger of drinking well-water obtained from porous strata, in the vicinity of dead wells. In 1862, 13 cases of this fever were admitted into the Royal United Hospital, of which 6 died, and in the following 5 years 25 cases were treated there, of which 7 died. In addition to these, a considerable number of cases of typhoid occurred in Bath, 19 being attended in the Hospital or City district.

TYPHUS, 1864.

I have been unable to find any account of this disease as an epidemic in Bath ; but it will be seen upon reference to some of the preceding Tables that a not inconsiderable number of cases of typhus have occurred in Bath and the surrounding villages in former years. In the year 1864 there were several cases, and an outbreak occurred at the Refuge for Tramps, in the Abbey Green, three cases being admitted into the United Hospital from that house. A very excellent account of this occurrence is given by Dr. Goodridge, in a letter addressed by him to the Committee of the Refuge. At that time I held the post of Resident Medical Officer at the Hospital. The master and matron of the Refuge and their son were attacked with typhus, and were conveyed to the Hospital, where the first two died, and the son recovered. Authorities agree that this fever is generated *de novo* by the overcrowding of squalid human beings with deficient ventilation ; and, unfortunately, these conditions were present in a marked degree at the Refuge. The squalor of the tramps was extreme, and the rule of washing upon admission extended only to the face, hands, and feet, the under clothing not being removed. They then went to the dormitories, and the larger majority being men, the principal room was occupied by them, and always *filled* before another was used. There were 8 beds in this room. Its length was 20 ft. 8 in., breadth 16 ft. 3 in., height 8 ft. 9 in., or about 367 cubic feet to each occupant. There was a small fireplace in the corner of the room without a fire.

The windows, of which the bottom sashes alone opened, were always shut at night, and the door, after the admission of the men, was locked. The smell upon opening the room in the morning is said to have been most offensive, and could hardly have been otherwise, the ventilation being insufficient for the size of the room or the number of occupants. A similar state of things existed in the other rooms. The tramps, although requested to open the windows of the rooms before leaving them in the morning, seldom attended to the request, *and the master was in the habit of going himself to open them.* Further comment would be superfluous. The master and his family were constantly exposed to the contamination in a dilute form, and at last were overtaken by the consequences. Providentially these were the only cases, and the Committee caused the institution to be immediately closed, and to be thoroughly overhauled. It is now properly ventilated, and kept in as healthy a condition as such a house can be.

In 1864 sixteen cases of typhus (including the three just mentioned) were admitted to the United Hospital, of which three died. In 1865 three were admitted, and two died. Since this date there have been but two or three cases in the city.

SCARLET FEVER, 1863-4.

Scarlatina prevailed as an epidemic in these years. From 1st October, 1863, to 30th September, 1864, 214 deaths from this disease occurred in the Borough out of a total mortality of 1,331 from all causes. By instructions from the Board of Guardians, Mr. Hanham prepared a report upon the sanitary state of the city at that time, and from his monograph I find that the epidemic was most severe in two particular districts. One of these comprised Morford Street, Portland Place, Northampton Buildings, and neighbourhood; and the other Avon Street, Milk Street, Kingsmead Street, and the Upper Bristol Road. The reasons for the selection by the disease of these particular localities appear to have been insufficient water to flush and cleanse the sewers, drains, and closets; the

herding together of many families in the same house, or too many living in one, oftentimes a small, apartment ; and the insufficient closet accommodation. The purity of the water supplied to some of the houses in which scarlet fever existed is also a matter of doubt.

SMALL POX, 1865.

This disease became epidemic again in Bath during this year, and 805 deaths were registered from it in the *Bath Registration District*.

MEASLES.

An account of an epidemic of measles, 1867, will be found in the report for that year.

Pulmonary Consumption causes a considerable number of deaths in Bath. Between 8th April, 1866, and 30th July, 1868, 296 persons died of this disease, or about 130 per annum, giving a death rate of 2·6 per 1,000. It must, however, be remembered that many invalids suffering from consumption visit Bath on account of the mildness of the climate during the winter months, and it does not appear that the disease is *endemic* in the city.

SECTION II.

Report on the Mortality and Sanitary Condition of the City for the year 1867.

IN the preceding pages I have endeavoured to furnish a sketch of the general condition of Bath in a sanitary point of view, and also an outline of the mortality and principal epidemics in the years preceding 1867. In this and the following section I purpose investigating the mortality and existence of disease in the city in the years 1867 and 1868.

TABLE XXIV.
Meteorology of 1867.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Highest Reading of Barometer	...	In. 30·18	In. 30·56	In. 30·73	In. 30·41	In. 30·22	In. 30·59	In. 30·32	In. 30·49	In. 30·40	In. 30·49	In. 30·30
Lowest	...	28·84	29·10	29·37	29·10	29·47	29·74	29·47	29·88	29·81	29·53	28·91
Mean Height of Barometer	...	29·51	29·83	30·05	29·75	29·84	30·16	29·89	30·06	30·15	29·90	29·61
Range of Pressure during Month	...	1·34	1·46	1·36	1·31	0·75	0·85	0·85	0·37	0·68	0·99	1·39
Highest Reading of Thermometer in Shade	...	Deg. 57	Deg. 62	Deg. 66	Deg. 78·5	Deg. 78·	Deg. 77·	Deg. 81·4	Deg. 77·5	Deg. 69·	Deg. 60·1	Deg. 57·
Lowest	...	14·3	34·5	24·9	36·6	35·5	46·3	45·	40·4	34·6	25·8	25·4
Range of Temperature in Shade	...	42·7	27·5	40·6	29·4	43·	31·7	32·	36·4	34·4	34·3	31·6
Mean Temperature of Month	...	35·6	48·2	45·2	51·3	57·	61·8	61·	63·2	59·	51·8	41·2
Mean Maximum Temperature of the Air	...	42·1	52·9	46·2	60·8	64·1	71·	71·8	73·6	68·7	58·1	44·5
Mean Minimum	...	34·1	44·3	35·3	46·8	48·	50·6	54·8	54·6	53·1	46·5	37·2
Maximum Daily Range of Temperature	...	16·9	16·9	23·5	27·3	27·	26·4	27·8	36·	25·5	22·9	21·2
Minimum	...	0·	0·	2·9	4·	2·	7·8	7·	6·3	7·4	1·7	1·2
Mean Daily Range of Temperature	...	8·	8·5	10·6	13·3	16·7	17·	16·6	19·	15·6	11·6	7·3
Amount of Rainfall in inches	...	In. 2·83	In. 2·26	In. 4·20	In. 2·67	In. 1·99	In. 2·35	In. 3·29	In. 2·82	In. 1·88	In. 3·48	In. 1·74
Number of Days on which Rain fell	...	13	18	16	20	13	11	21	12	18	23	11
Average Direction of Wind	...	Var.	Var.	E	Var.	SW	NW	WSW	W	SW	N	W
Snow (S.) ; Thunder Storms (T.S.)	...	S. 4*	S. 1	S. 11	...	...	...	T.S. 1	T.S. 2	T.S. 2	...	S. 4

* The figures show the number of days.

REGISTRATION DISTRICT.

The Registration District of Bath is divided into seven sub-districts. Two of these are out of the Borough, and a third embraces the adjacent villages of Bathampton, Claverton, and Monckton Combe, in addition to the parish of Bathwick, which is the only part of that sub-district within the Borough boundaries. Each of these sub-districts has a registrar and deputy-registrar, and there is a superintendent registrar of the district, at whose office, Abbey Street, Bath, are deposited all registers, from the year 1837, of births, marriages, and deaths in the several parishes comprised in the district.

I. The *West Walcot* or Lansdown sub-district commences from Prince's Buildings, up the Lansdown Road, Oxford Row, Belvedere, and Lansdown Road to Springfield Place, and includes all that part of Walcot to the west and south thereof. Population 15,008.

II. The *East Walcot* sub-district commences at the corner of Fountain Buildings, passing by Belmont up the east side of Lansdown Road, to about 100 yards east of Springfield Place, to the parish and borough boundary stone. This sub-district includes the eastern part of the parish of Walcot, except the portion on Lansdown known by the name of Soper's Farm. Population 11,268.

III. The *Abbey* sub-district comprises the parishes of St. Peter and St. Paul, St. James, and St. Michael. Population 11,086.

IV. The *Lyncombe and Widcombe* sub-district comprises the parishes of Lyncombe and Widcombe. Population 9,900.

V. The *Parish of Bathwick*. Population 5,266.

MARRIAGES.

The number of marriages performed in the Borough of Bath in 1867 was 650. The marriage rate for the year 12·3 per 1,000, that of the United Kingdom for the same period was 16·68 per 1,000.

BIRTHS.

The number of registered births in the Borough of Bath in 1867 was 1,349, giving a birth rate of 25·6 per 1,000. This

is exclusive of a certain small number which are, from various causes, never registered. The birth rate of the United Kingdom in 1867 was 35·84 per 1,000. The excess of the births in Bath over the deaths in 1867 was 154, making a gain to the population of 3½ per cent.

DEATHS.

The total number of deaths registered in the Borough of Bath for 1867 was 1,195, giving a death rate of 22·4 per 1,000. The death rate of the United Kingdom for the same period was 21·98 per 1,000. The deaths in Bath were therefore in excess of those of all England by ·042 per 1,000.

TABLE XXV.

Deaths in the Sub-Districts in 1867.

SUB-DISTRICTS.	QUARTERS ENDING.								Year.	Ratio per 1,000.
	31st March.	Ratio per 1,000.	30th June.	Ratio per 1,000.	30th Sept.	Ratio per 1,000.	31st Dec.	Ratio per 1,000.		
Abbey	74	26·7	69	24·9	64	23·1	93	33·6	300	27·0
West Walcot...	94	25·0	73	19·4	36	9·5	80	21·2	283	18·9
East Walcot ...	78	27·6	49	17·4	39	13·7	56	19·9	222	19·6
Lyncombe & Widcombe }	77	31·2	65	26·3	74	29·9	90	36·4	306	30·9
Parish of Bathwick }	27	20·5	23	17·3	16	12·0	18	13·8	84	15·9
Total ...	350	26·2	279	21·0	229	17·6	337	24·9	1195	22·4

The higher death rates of the Abbey and Lyncombe and Widcombe sub-districts are occasioned by the mortality in the United Hospital and in the Workhouse, the first being in the former and the second in the latter.

The number of deaths from *Sporadic* causes amounted to 1,091; from *Zymotic* causes to 104. The ratio of deaths from zymotic to total causes was 11·5 per cent.

TABLE XXVI.

*Summary of Causes of, and Ages at, Death in 1867.**

DISEASES.		AGES AT DEATH.		TOTALS.	
Classes.	Orders.	Under 5 Years.	5 Years and upwards.	In each Order.	In each Class.
1. Zymotic ...	1. Miasmatic ...	59	40	99	104
	2. Enthetic ...	4	1	5	
	3. Dietic... ...	—	—	—	
2. Constitutional..	1. Diathetic ...	13	107	120	322
	2. Tubercular ...	56	146	202	
3. Local	1. Nervous System	73	115	188	568
	2. Circulation ...	1	48	49	
	3. Respiration ...	81	165	246	
	4. Digestion ...	5	51	56	
	5. Urinary Organs ...	...	20	20
	6. Uterine Organs ...	...	7	7
	7. Joints ...	...	2	2
	8. Skin ...	...	...	...
4. Developmental.	1. Of Children ...	21	...	21	144
	2. Of Adults ...	...	4	4
	3. Of Old People..	...	108	108	
	4. Of Nutrition ...	8	3	11	
5. Violent Deaths	1. Accident or Negligence }	11	26	37	47
	2. Suicide ...	...	5	5
	3. Homicide ...	4	1	5	
6. Sudden Deaths	No causes assigned	1	7	8	8
7. Causes not Specified }	1	1	2	2
		338	857	...	1195

* According to the Nosology of Dr. Farr.

TABLE XXVII.

Causes of, and Ages at, Death in the Borough in 1867.

Diseases.	Under 1 year.	1 Year.	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.
													Under 5.	Above 5.	
Class 1.— <i>Zymotic Diseases.</i>															
Order 1.— <i>Miasmatic.</i>															
1 Measles		2	2										4		4
2 Scarlet Fever...	1						1						1	1	2
3 Quinsy					1								1		1
4 Diphtheria								1						1	1
5 Croup	1		1		1	1							4		4
6 Hooping Cough ...	6	5	3	2	1								17		17
7 Typhoid Fever ...			2	2	1		2	5	2	2	1		5	12	17
8 Typhus Fever ...							1		1					2	2
9 Remittent Fever ...				1									1		1
10 Ague												1		1	1
11 Erysipelas	1								2			1	1	3	4
12 Pycæmia					1			1	1				1	2	3
13 Metria								1						1	1
14 Carbuncle									1	1	3			5	5
15 Influenza	1												1		1
16 Dysentery									1	4				5	5
17 Diarrhœa	20	2							1	1	5		22	7	29
18 Cholera (English) ...	1												1		1
													59	40	99
Order 2.— <i>Enthetic.</i>															
1 Syphilis	4							1					4	1	5
Class 2.— <i>Constitutional Diseases.</i>															
Order 1.— <i>Diathetic.</i>															
1 Gout											1			1	1
2 Rheumatism											1			1	1
3 Anæmia	11							1	2	4	4	2	11	13	24
4 Diabetes										1				1	1
5 Asthma									2	4	4	1		11	11
6 Dropsy									12	21	11	2		46	46
7 Cancer; scirrhus ...									3	6	4			13	13

TABLE XXVII. (Continued.)

Diseases.	Under 1 Year.	1 Year.	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.
													Under 5.	Above 5.	
8 Cancer; other forms...		1	1						2	8	4	1	2	15	17
9 Dry Gangrene ...										2	3	1		6	6
													13	107	120
Order 2.— <i>Tubercular Diseases.</i>															
1 Scrofula ...	2							2	1				2	3	5
2 Psoas Abscess ...										1				1	1
3 Mesenteric Disease ...	1	2	3										6		6
4 "Marasmus" ...	20	5		1	1		2	1		1	1		27	5	32
5 Consumption ...	1		1	1		1	2	37	71	18			4	128	132
6 Spitting of Blood ...								1	4	2				7	7
7 Tubercular Meningitis	4	5	2	3	2	1		2					17	2	19
													56	146	202
Class 3.— <i>Local Diseases.</i>															
Order 1.— <i>Diseases of Nervous System.</i>															
1 Meningitis ...		1	1	1			3		2	1			3	6	9
2 Encephalitis ..								2	4	1	3			10	10
3 Myelitis ...		1							1	3	1		1	5	6
4 Apoplexy ...									3	15	12	2		32	32
5 Paralysis ...								4	5	24	11	1		45	45
6 Mania... ..			1					1					1	1	2
7 Delirium Tremens ...										2				2	2
8 Epilepsy ...			1					2	3	2	2		1	9	10
9 Convulsions ...	42	8	8	2							1		60	1	61
10 Eclampsia ...	2	1	1										4		4
11 Laryngismus Stridulus	2	1											3		3
12 Cerebral Softening ...							1		1	2				4	4
													73	115	188
Order 2.— <i>Diseases of the Circulatory Organs.</i>															
1 Endocarditis ...								1	1					2	2
2 Valvular Disease of Heart ...								1	1	4	2			8	8

TABLE XXVII. (Continued.)

Diseases.	Under 1 Year.	1 Year.	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.
													Under 5.	Above 5.	
3 Disease of the Heart— <i>form not stated</i> ...								2	6	11	7			26	26
4 Fatty Degeneration of the Heart ...									1	2	1			4	4
5 Angina Pectoris ...									1					1	1
6 Syncope ...	1							1	1	4	1		1	7	8
													1	48	49
Order 3.— <i>Diseases of Respiratory System.</i>															
1 Laryngitis ...				1					1				1	1	2
2 Œdema Glottidis ...										1				1	1
3 Bronchitis ...	14	12	4	2	1		4	2	8	5	2	29	33	118	151
4 Pleurisy ...						1			1	2			1	3	4
5 Hydrothorax ...										1				1	1
6 Pneumothorax ...								1						1	1
7 Congestion of Lungs...	4	1							3	3	1	1	5	8	13
8 Pneumonia ...	15	13	5	5	2			3	7	7	2		40	19	59
9 Emphysema ...									1	2				3	3
10 "Disease of Lungs"— <i>no variety assigned</i> ...		1					1		4	4	1		1	10	11
													81	165	246
Order 4.— <i>Diseases of Digestive System.</i>															
1 Stomatitis ...				1									1		1
2 Gastritis ...									1	2				3	3
3 Enteritis ...	1		1						1		1		2	2	4
4 Peritonitis ...							1	1	1	2				5	5
5 Ileus ...								1	1	1				3	3
6 Intussusception ...										1				1	1
7 Hernia ...	1								1	2			1	3	4
8 Ulcer of Stomach ...									3	2	2	1		8	8
9 Vomiting of Blood ...										1				1	1
10 Diseases of the Liver...									2	3	1			6	6
11 Jaundice ...			1						1	3	1	2	1	7	8
12 Cirrhosis ...										1				1	1

TABLE XXVII. (*Continued.*)

Diseases.	Under 1 Year.	1	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.
													Under 5.	Above 5.	
Order 3.— <i>Of Old People.</i>															
1 Senile Decay										5	43	60		108	108
Order 4.— <i>Of Nutrition.</i>															
1 Atrophy	8						1	1		1			8	3	11
Class 5.— <i>Deaths from Violence.</i>															
Order 1.— <i>Accident.</i>															
1 Burn		1				1		2		1			2	3	5
2 Scald		1	1										2		2
3 Rupture of Lung									1					1	1
4 Drowning						1		1	2				1	3	4
5 Suffocation	5								1				5	1	6
6 Fracture of Skull		1						2	1	3	2		1	8	9
7 Concussion of Brain										2				2	2
8 Cut, Stab, &c.							1	1		1				3	3
9 Poisoning									1					1	1
10 Shock from Operation									2		1	1		4	4
													11	26	37
Order 2.— <i>Suicide.</i>															
1 Drowning									1					1	1
2 Hanging									1	1				2	2
3 Poisoning										1				1	1
4 Cut Throat										1				1	1
													0	5	5
Order 3.— <i>Homicide.</i>															
1 Murder	1	1	1			1		1					4	1	5
Class 6.— <i>Sudden Deaths.</i>															
Order 1.— <i>No cause assigned.</i>															
1 Visitation of God.	1							1		2	2	2	1	7	8
Class 7.— <i>Causes not specified.</i>															
1 Run over in highway...								1						1	1
2 Found Dead	1												1		1
													1	1	2

N.B.—The causes of Death are given strictly as they are returned to me by the Registrars.

TABLE XXVIII.

Total Number of Deaths at Different Ages, in 1867.

Under 1 Year.	1 Year.	2	3	4	5	Total under 5 Years.	Under 10 Years.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Total above 5 Years.	Total.
188	70	39	23	11	7	338	20	93	200	263	179	102	857	1195

DEATHS FROM SPECIAL CAUSES.

Of the 1,195 deaths which occurred from all causes in 1867, 99 were occasioned by diseases belonging to the class of *Fevers*, most of which are contagious. The population being taken at 53,246, the death rate from this variety of disease was 1·9 per 1,000. More than half the cases were children under five years of age.

From *Constitutional Diseases* there were 120 deaths, nearly all the cases being adults. Dropsy and cancer are types of this class. The death rate of the class was about 2·25 per thousand.

The deaths from *Tubercular Diseases* number nearly one-sixth of the whole, and of these Consumption was the most fatal. Marasmus (which is more a *symptom* than a *disease*) caused 32 deaths. The mortality from Consumption was 2·5 per 1,000, and from the whole class of tubercular diseases 3·7 per thousand.

The group of *Local Diseases* contains a large number of disorders, and proved fatal in 568 cases, or nearly one-half of the whole mortality of the Borough. Of these diseases Convulsions, Bronchitis, and Pneumonia occasioned the greatest number of deaths; the mortality from the whole class being 10·5 per 1,000. Bronchitis was fatal to 151 persons, and caused nearly two-thirds of the deaths in the order of respiratory diseases.

In the fourth class, *Developmental Diseases*, 21 of the deaths were in young children from premature birth, teething,

&c. ; 108 persons died from old age, of whom 60 were upwards of 80 years of age. The total mortality from this class of disorders was 2·6 per 1,000.

Thirty-seven deaths were occasioned by *accident* or *negligence*, fracture of the skull being the most fatal in this class. Five persons committed *suicide*, and five were *murdered*, four of the latter being children. The number of *violent* deaths was therefore 47, being a ratio of 0·9 per 1,000. Eight deaths are included in the 6th class. Upon the bodies coroner's inquests were held, and the verdicts of the juries are returned as the causes of the deaths. Lastly, one person was *run over*, and an infant was *found dead*.

LOCALITIES OF DEATHS.

In the next Tables are given the localities of the more important deaths. Of those in the zymotic class, 17 were caused by typhoid fever, and of these 7 occurred in the Abbey sub-district, 4 in the West Walcot, 3 in East Walcot, and 3 in Lyncombe and Widcombe. Two were in the United Hospital, and two in the Workhouse. The deaths from typhus were but two, one occurred in Moorfield Place, and the second in the Villa Fields.

TABLE XXIX.

Mortality from Contagious Diseases.

SUB-DISTRICTS.	Measles.	Scarlet Fever.	Diphtheria.	Hooping Cough.	Typhoid Fever.	Typhus.	Diarrhœa.	Others.	Total.
Abbey	1	...	1	6	7	...	5	11	31
West Walcot...	...	...	...	4	4	...	6	5	19
East Walcot ...	...	1	...	4	3	1	2	1	12
Lyncombe & } Widcombe }	3	1	...	3	3	...	12	9	31
Bathwick ...	...	...	...	...	...	1	4	1	6
Total ...	4	2	1	17	17	2	29	27	99

Six of the Deaths from Diarrhœa occurred in the Workhouse.

TABLE XXX.
Mortality from Tubercular Diseases.

SUB-DISTRICTS.	Pulmonary Consumption.	Tubercular Meningitis.	Mesenteric Disease.	Others.	Total.
Abbey	36	5	...	10	51
West Walcot	23	4	2	9	38
East Walcot	29	7	1	8	45
Lyncombe and Widcombe ...	34	2	3	16	55
Bathwick	10	1	...	2	13
Total	132	19	6	45	202

TABLE XXXI.
Mortality from Diseases of Respiratory Organs.

SUB-DISTRICTS.	Bronchitis.	Pneumonia	Others.	Total.
Abbey	33	32	13	78
West Walcot	42	10	8	60
East Walcot	28	6	8	42
Lyncombe and Widcombe ...	35	9	3	47
Bathwick	13	2	4	19
Total	151	59	36	246

TABLE XXXII.
Mortality from Accidents.

SUB-DISTRICTS.	Burnt.	Scalded.	Suffocated.	Fractured Skull.	Others.	Total.
Abbey	4	2	2	9	7	24
West Walcot ... ..	...	...	1	...	2	3
East Walcot	1	...	1	...	1	3
Lyncombe and Widcombe ...	...	...	2	...	4	6
Bathwick ... ..	...	...	...	...	1	1
Total	5	2	6	9	15	37

TABLE XXXIII.
Mortality in the Workhouse, 1867.

DISEASES.	UNDER 5 YEARS.			ABOVE 5 YEARS.			Total.
	Males.	Females.	Total.	Males.	Females.	Total.	
Typhoid Fever ...	...	...	...	1	1	2	2
Diarrhœa, Dysentery ...	2	4	6	1	3	4	10
Carbuncle ...	...	...	...	1	...	1	1
Dropsy ...	...	...	...	2	9	11	11
Cancer ...	...	...	...	1	2	3	3
Diseases of Brain : Paralysis	1	1	2	9	14	23	25
Tubercular Disease ...	1	5	6	10	5	15	21
Diseases of the Lungs ...	...	1	1	7	6	13	14
" " Heart ...	...	...	...	...	1	1	1
" " Liver ...	...	...	...	...	1	1	1
Old Age ...	...	...	...	12	10	22	22
Atrophy ...	2	1	3	...	...	...	3
Others ...	...	...	...	...	1	1	1
Total ...	6	12	18	44	53	97	115

Of the above, 101 were admitted from Parishes within the Borough of Bath and 14 from Country Parishes.

TABLE XXXIV.
Mortality in the Royal United Hospital, 1867.

DISEASES.	UNDER 5 YEARS.			ABOVE 5 YEARS.			Total.
	Males.	Females.	Total.	Males.	Females.	Total.	
Typhoid Fever	1	1	2	2
Rheumatism	1	1	1
Gout	1	...	1	1
Consumption	5	2	7	7
Meningitis	1	...	1	1
Paralysis, Cerebral Softening	2	2	2
Morbus Cordis	1	1	1
Nephritis	1	1	1
Pneumonia ...	1	...	1	3	...	3	4
Bronchitis	2	2	2
Uterine Disease	1	1	1
Diseases of Urinary Organs.	2	...	2	2
Hernia	3	3	3
Fractures, Wounds, &c	12	...	12	12
Others ...	5	4	9	12	4	16	25
	6	4	10	37	18	55	65

TABLE XXXV.

Mortality in other Institutions, 1867.

Mineral Water Hospital	St. Catherine's Hospital	St. John's Hospital	Homœopathic Hospital	Establishment for the Aged.	Total.	Total of Deaths in the Hospitals and Workhouse.
5	1	1	2	3	12	192

TABLE XXXVI.

Prices of Provisions and the Death Rate, 1867.

Quarter Ended	Wheat per Quarter		Potatoes per Ton.		Beef per lb.	Mutton per lb.	Mean Height of Barometer.	Death Rate per 1,000.
	s.	d.	s.	d.	d.	d.	In.	
31st March ...	60	7	137	6	6	6	29.79	26.2
30th June ...	63	11	155	0	5½	6¼	29.91	21.3
30th September ...	65	4	127	6	5¾	6	30.03	17.0
31st December ...	67	11	132	6	5½	5½	29.84	25.1

TABLE XXXVII.

Patients Treated in Institutions during 1867.

	Royal United Hospital.	Mineral Water Hospital.	DISPENSARIES.			Poor Law Union.*	Others.	Total.
			Eastern.	Southern	Western.			
In-Patients ...	787	497	...	...	...	...	...	1284
Out-Patients ...	10,221	...	3067	675	1355	2752	2273	20,343
Total ...	11,008	497	3067	675	1355	2752	2273	21,627

* Including the Workhouse.

Number of Tramps relieved at "The Refuge," Abbey Green :

In 1866	...	...	...	4426
In 1867	...	...	...	5032

EPIDEMICS, 1867.

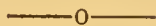
The southern part of the city suffered from an epidemic of measles, which commenced in the sub-district of Lyncombe and Widcombe, many cases occurring in the Dolemeads, and was first reported by me to the Board of Health on 18th November. The disease was chiefly confined to very young children, and was of a mild form ; nearly all the deaths were due to pneumonia supervening upon measles, from exposure to cold before the children were entirely quit of the disorder. In the two months ending 31st December, 70 cases of measles were attended at their own homes in the Royal United Hospital district, and the focus of the disease was in Wine Street, the courts leading out of Southgate Street, the Quay, Avon Street, and in the Dolemeads. Only a few cases were attended from the Eastern Dispensary, and those were in Grove Street. Beyond all doubt the spread of an epidemic of measles is occasioned by the unrestrained intercourse which is permitted between infected and healthy children ; the disease being brought home by the children from the schools in the neighbourhood, they communicate it to their brothers and sisters and to the other children living in the same house, and seldom is any effort made on the part of the parents to check it by the only preventable means (which are not always in their power), isolation. There was no other epidemic disease in Bath during the year, and up to the middle of October not more than an average amount of sickness existed in the city. Hooping cough accompanied and followed the epidemic of measles, continuing prevalent till February, 1868. A child died of infantile cholera on 30th June, 1867, at Cottage Place, Larkhall, aged six months, after an illness of two days. This was the only death from that disease during the year. A death from malignant scarlet fever in February was returned, and two or three deaths from malignant measles occurred in the Dolemeads during the progress of the epidemic.

The weekly mortality has fluctuated considerably during the past year. The greatest number of deaths recorded in a week was 38, which happened in that ending 25th December ;

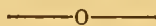
the next largest amount, 36, occurred three times, in the weeks ending 2nd January, 23rd January, and 3rd April. The lowest number returned was 11, in the weeks ending 15th May and 14th August. Twelve deaths were registered in the weeks ending 24th July and 9th October. The death rate of eleven weeks from 1st July to 23rd September, inclusive, was only 16 per 1,000. The average weekly mortality of the year was 23 deaths.

Between the 1st January and 31st December I reported the sanitary state of about 245 houses to the Board of Health, which I had either inspected myself or which had been visited by the Inspector of Nuisances under my directions. The houses were for the most part situated in the worst parts of the city, and the condition of many of them was extremely prejudicial to the health of the inhabitants, privies abounding, and being in most instances foul and offensive. The ventilation of some of the houses was bad, and in not a few there were instances of overcrowding to a greater or less degree. Many of the defects enumerated have been remedied, but some of the evils reported remain to the present date. I caused a thorough inspection of the slaughter houses to be made, and framed a report thereon to the Local Board in July, of which the substance is given in an earlier part of this volume. The condition of the lodging houses, mews, sewerage, water supply, and other matters bearing on the sanitary state of the city, has been reported to the Board from time to time, and I cannot close the remarks upon the year 1867 without adding my tribute of praise to the most active and intelligent Inspector of Nuisances, Mr. H. G. Montague, who was appointed by the Town Council to that office upon the death of Inspector Bond. His co-operation with, and assistance to me, have been at all times most valuable, and I consider his appointment an acquisition to the city generally.

SECTION III.



Report on the Mortality and Sanitary Condition of the City for the Year 1868.



THE chief data with regard to the meteorology of the different months are given in Table XXXVIII. A very remarkable feature of the year was the long-continued drought during the months of May, June, and July, accompanied in the latter month by excessive heat. From the 28th April to the 4th August, inclusive—a period of 126 days—the rainfall amounted to 1·52 in. only; and with the exception of a thunder storm on the 29th May, and a storm on the 4th June, no rain fell between 25th May and 18th June. Two other long rainless periods occurred between the 24th of June and the 9th July and the 16th to the 26th July. During this long epoch of drought rain fell on 23 days only, and on 8 of these the amount was exceedingly small, being hardly sufficient to lay the dust in the roads. The effect upon the land was most marked, and the hills around the city presented an arid appearance rarely seen; and as a consequence the springs became low, and the water supply to the city extremely limited. The temperature of the air in the shade rose above 80 deg. twice in June, on ten days in July, and thrice in August. The highest readings were on July 15th, 86 deg.; 21st, 87 deg.; 22nd, 89·8 deg.; and August 4th, 84·8 deg. So high a temperature as that of July 22nd has not been experienced in Bath for very many years. The public health was exceedingly good throughout this warm dry period, the weekly mortality averaging 19 deaths, or 18 per 1,000.

T A B L E X X X V I I I .

Meteorology of 1863.

Barometer—Negretti's standard, on Fortin's principle; diameter of tube, 0·7 inch. Height of Cistern above Half-tide Level, 126 ft. Readings corrected for Temperature, and reduced to Half-tide Level. *Thermometers*—By Burrow, Malvern; verified at Kew Observatory. *Rain Gauge*—On Casella's principle. Height of top of Funnel above Ground, 15 in.; above Half-tide Level, 145 ft. Diameter of Funnel, 5 in.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
Highest Reading of Barometer	30·471	30·643	30·579	30·411	30·423	30·475	30·470	30·227	30·271	30·356	30·599	30·175
Lowest	29·042	29·359	29·171	28·877	29·496	29·706	29·451	29·268	29·043	29·435	28·954	28·655
Mean Amount of Pressure	29·756	30·001	29·875	29·644	29·959	30·090	29·960	29·747	29·657	29·902	29·776	29·415
Range of Pressure during Month	1·429	1·284	1·408	1·534	0·927	0·769	1·019	0·959	1·228	0·921	1·645	1·520
	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.	Deg.
Highest Reading of Thermometer in Shade	53·1	63·5	61·5	67·	79·	81·2	89·8	84·8	78·6	61·9	61·2	58·2
Lowest	23·5	30·5	30·3	28·5	38·9	45·	49·5	48·8	43·1	31·4	26·2	36·
Range of Temperature in Shade	29·6	33·	31·2	38·5	40·1	36·2	40·3	36·	35·5	30·5	35·	22·2
Mean Temperature of Month	38·3	47·	45·9	48·7	58·9	63·1	69·6	66·8	60·8	49·4	43·2	48·2
Mean Maximum Temperature of the Air	42·6	51·6	53·9	59·	69·8	74·7	77·	70·3	68·2	56·7	47·8	51·8
Mean Minimum	36·2	41·4	40·9	42·8	50·4	53·3	60·7	56·8	51·3	42·2	38·7	44·5
Maximum Daily Range of Temperature	12·	21·2	25·3	27·4	31·8	29·	26·5	23·9	28·3	23·2	17·4	15·
Minimum	0·7	2·4	4·	6·5	7·2	10·5	7·	3·	5·	5·1	3·	2·9
Mean Daily Range of Temperature	6·	9·6	12·9	15·9	18·7	21·3	17·4	13·5	16·8	17·4	9·3	7·1
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
Amount of Rainfall in inches	4·992	1·903	1·698	2·185	·786	·630	·706	4·988	3·376	2·642	2·063	5·859
Number of Days on which Rain fell	15	11	15	14	11	8	7	21	13	17	19	29
Average Direction of Wind	Var.	w	sw	w	sw	ws	Var.	sw	ENE	sw	NE	sw
Mean Force of Wind (0·12) ...	3	3	2·3	2·	2·5	1·7	3·	3·5	3·7	1·4	3·5	4
Mean Amount of Ozone (0·10)	...	...	...	...	...	...	...	2·4	3·5	0·3	2·4	5
Mean Amount of Cloud (0·10)	...	...	...	6·	...	...	...	7·3	5·	5·	8	7·5
Snow (S.) ; Thunder Storms (T.S.)	S. 4*	...	...	...	...	...	...	...	...	...	...	T.S. 3

* The figures show the number of days.

SUMMARY OF TABLE XXXVIII.

Mean of all the Highest Readings of					
Barometer ... ..	...	...	...	30.425	in.
Mean of all the Lowest ditto ... ..	...	...	...	29.204	"
Mean Height of Barometer during the year	29.814				"
Mean Range of Pressure ... ..	...	...	...	1.221	"
Highest Reading of Barometer ... ..	...	...	...	30.643	" 11th Feb.
Lowest " " " " " " " " " "	...	...	...	28.655	" 24th Dec.
Range of Pressure during the year ... ..	...	...	...	1.988	"
Highest Reading of Thermometer in					
Shade ... ..	...	...	...	89.8	deg. 22nd July.
Lowest ditto ... ..	...	...	...	23.5	" 3rd Jan.
Range of Temperature during the year	66.3				"
Mean Temperature of the year... ..	...	...	...	53.3	"
Mean Maximum Temperature of the Air	60.2				"
Mean Minimum " " " " " " " "	46.6				"
Mean Maximum Daily Range of Tem-					
perature ... ..	...	...	...	23.4	"
Mean Minimum ditto ... ..	...	...	...	4.7	"
Mean Daily Range of Temperature	13.8				"
Amount of Rainfall during the year ...	31.828				in.
Greatest fall in 24 hours ... ..	...	...	...	1.652	" 18th Aug.
Number of Days on which Rain fell ...	180				
Number of Days on which Snow fell ...	4				
Number of Frosty Nights ... ..	...	...	...	27	

Winds during the Year:—

Direction ...	N.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	Calm.	Vari- able.
No. of Days...	9	6	36	42	8	6	10	6	14	17	75	33	35	14	11	9	29	6

Complaints of the shortness of the water supply were frequent and loud, and in September the springs supplying the Batheaston reservoirs had become so low that the water flowed directly into the pipes ; the reservoirs were empty, and there was no storage of water. Yet, upon visiting the springs in the vale of St. Catherine at this date, with the City Engineer, *I found them all flowing*, even those called the Seven Springs,

near the summit of Charmey Down ; and from the Monks' Wood Spring *alone* more water was flowing than from all those supplying the Batheaston reservoirs.

TABLE XXXIX.
Rainfall in Bath and its Neighbourhood in 1868.

Paragon, Bath, C. S. BARTER.	In.	31·82	Literary Institution, C. P. RUSSELL.	In.	30·53	Weston.	In.	30·41	Batheaston, A. MITCHELL, Esq.	In.	30·17	Bristolington, G. THOMAS.	In.	31·88	Chew Magna, Bristol Water Works.	In.	36·31	Frome, Mells, Rev. J. HONNER.	In.	43·40	Chippenham, Major GRITTON.	In.	26·93	Trowbridge, Sunnyside, W. J. MANN, Esq.	In.	31·57	Marlborough, Rev. T. A. PRESTON.	In.	34·92	Bristol, Small Street.	In.	30·69	Bristol, Montpelier.	In.	33·78	Clifton, Dr. BUNDER.	In.	34·11	Berkeley, E. OSBORNE, Esq.	In.	32·54	Cirencester, T. C. BROWN, Esq.	In.	32·68
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The necessity of a larger and purer supply of water to the whole city of Bath cannot for a moment be doubted ; water is to be had pure and in abundance, at a comparatively short distance ; other cities and towns have gone many miles

further, and with far greater disadvantages, for a good and abundant water supply. Bath should lose no time in securing her share of the health-giving and health-preserving fluid, which Nature has placed within such easy reach, and in such purity and plenty. And it would be highly advantageous to the inhabitants if the whole of the water supply were under the control of one body—the Corporation of Bath.

In December, rain fell on every day but two, in greater or less quantity. The first part of the winter of 1868-9 was very mild, with the exception of three or four cold nights in November, and the year has been notable for a high mean temperature. The total rainfall has been below that of many previous years, but has not been excessively low, and in this point was greatly exceeded in 1864, when only $19\frac{1}{2}$ inches of rain fell in Bath. North-easterly winds were prevalent, but were neutralised by the southerly and westerly breezes which blew on 174 days in the year.

The water supply of the city has caused much and animated discussion during the year; and many of the inhabitants of the upper part of the city have memorialised the Home Secretary on the quantity and condition of the water supplied them for drinking purposes. The Cold Water Committee (a sub-committee of the Town Council) forwarded samples of the water supplied by Mr. Dickenson to Cavendish Place and neighbourhood, of the Circus Water Company, and the Charcombe Company, to Dr. Letheby. Subjoined is his report thereon :—

Copy of Dr. Letheby's Analysis.

College Laboratory, London Hospital;
Oct. 17th, 1868.

DEAR SIR,

I have to report to you the results of the analysis of the five samples of water which you sent here on the 28th ultimo.

They were contained in 10 Winchester quart bottles, and were securely stoppered.

They were labelled A, B, C, D, and E.

All the samples were perfectly bright and colourless, even when examined in large volume—as in a glass tube two feet in

length—and they were quite free from smell or objectionable flavour.

The constituents per imperial gallon were as follows :—

	A	B	C	D	E
	grs.	grs.	grs.	grs.	grs.
Carbonate of Lime and Magnesia	14·38	16·04	13·00	12·60	13·10
Sulphate of Lime	12·49	11·62	7·55	8·13	4·94
Chloride of Sodium (Common Salt)	3·69	4·31	3·71	2·09	1·32
Nitrate of Lime... ..	11·68	13·52	10·77	5·13	4·31
Silica, Alumina, and Oxide of Iron:	0·82	0·91	0·65	0·65	1·00
Organic Matter	0·13	0·18	0·00	0·25	0·16
Total per Gallon ...	43·19	46·58	35·68	28·85	24·83
Hardness (degree) ...	23	28	24·	20	18
Ditto after boiling (ditto)	13	14·5	10·5	9·5	8

Each of the samples were tested for ammonia, but the proportion present was extremely small, the largest amount being in samples B and D, which contained respectively 0·008 and 0·009 of a grain per imperial gallon.

The amount of oxygen also required to oxydise the mere trace of organic matter present did not exceed 0·036 of a grain per gallon of water.

These results show that the waters are all remarkably free from organic matter, but they contain large proportions of nitrate of lime, the acid of which has been derived from organic matter that has been oxydised during its passage through the earth. The waters are also extremely hard, from the presence of large quantities of earthy salts, chiefly carbonate and sulphate of lime.

On these accounts the water is objectionable for domestic use, but they do not contain anything which is actually unwholesome.

I remain, dear Sir, yours truly,

ALFRED MITCHELL, ESQ.

H. LETHEBY.

NOTE.—The samples were taken from the following Springs:—

A—Mr. Dickenson's Spring supplying Cavendish Place.

B—Winifred Spring of Circus Water Company.

C—Syphon Spring of ditto.

D—Upper Spring of Charlcombe Water Company.

E—Reservoir of ditto.

Quantity of Water discharged per minute from the Springs of the following Water Companies :—

	Date.	Gals. per Minute.
Mr. Dickenson's Spring	Nov. 13, 1868	2 $\frac{1}{3}$
Circus Company's Syphon Spring ...	Nov. 20, 1868	5 $\frac{1}{4}$
Ditto Winifred ditto	ditto	3 $\frac{1}{2}$
Ditto Lower ditto	ditto	3 $\frac{1}{2}$
Charlcombe Company's Upper Spring..	ditto	9
Ditto Church ditto... ..	ditto	9 $\frac{1}{2}$
Ditto Drive ditto... ..	ditto	5 $\frac{1}{2}$
Corporation Works, Batheaston—		
Upper Springs	ditto	139
Lower ditto	ditto	97
Corporation Works, Bath—		
Sham Castle Springs	ditto	25
Beacon Hill ditto	ditto	22
Beechen Cliff ditto	ditto	39

N.B.—The Winifred Spring of the Circus Company is leased from the owner of Winifred House. The Charlcombe Company has Springs below its reservoirs discharging 24 gallons per minute.

Copy of a Letter received by Mr. E. C. Petgrave from Dr. Letheby.

Medical College,

The Laboratory ;

The London Hospital.

Nov. 20, 1868.

DEAR SIR,

In reply to your letter of Saturday's date I have to state that if only a few days elapsed between the taking of the samples of water and their being sent to me in September last, it is not probable that any notable change took place in the condition of the organic matter, if there was any, in the several samples of water ; for all the samples were in well-secured Winchester quart bottles. On reference to the analysis I perceive that the waters were all perfectly colourless when examined in large volume, as in a glass tube two feet in length ; and they all required but little oxygen to oxydise organic and other oxydisable matters. Moreover, excepting two of the waters, viz., those labelled B and D, the proportion of ammonia was very small. All these facts are strongly indicative of the absence of putrescent or putrescible organic matter. As to the presence of nitrates, the question of

its importance must have reference entirely to the strata whence the water has been drawn, for although in most cases they are indicative of previous organic contamination, yet in many instances they are entirely of pre-historic origin, and many have been derived from antediluvian creatures. Much nonsense has lately been written about "previous sewage contamination," especially by chemists who are not medical men, and who are wholly unacquainted with physiology and hygiene, and therefore much public alarm has been unduly excited by a mere figure of speech. My own experience, which is very considerable in this matter, is that some of the most wholesome waters contain nitrates, but when the waters are derived from the sub-soil of a town, the presence of nitrates is very suspicious.

I remain, dear Sir, yours truly,

(Signed) H. LETHEBY.

A report on the purity of the Bath water supply was circulated in November by Mr. Ekin, of Argyle Street, which is here inserted :—

"Now that a scheme for a better water supply for Bath is under consideration, I have thought it highly desirable that we should possess exact information as to the purity of the several springs forming the present supply, and have consequently been at the expense of considerable time and trouble to analyse them.

"Before giving the results I wish to call attention to one or two facts in connection with the subject which will tend to a clearer understanding of the details of the following analyses, and which the public is quite as capable of forming an opinion upon as the professed chemist.

"In speaking of the purity of a water, it must be always understood that such a term can only be used relatively, since nearly all springs contain animal organic matter, whether derived from direct sewage contamination, or from manured land.

"The organic matter in the presence of water is highly putrescible and prone to change, becoming oxydised either by the oxygen dissolved in the water, or by the atmosphere, into nitric acid, which is innocuous.

"Even sewage itself, if allowed to stand a sufficient number of days, ferments, and its organic poison becomes oxydised and rendered harmless.

"It is evident then from this that a sample of water containing a very appreciable amount of organic matter to-day, in three or four days' time *may* contain none, and *will certainly* contain much less ; hence the great importance of a water being analysed the same day, or at the latest the next day, that it is taken from its source.

"By way of a practical application of these considerations, if the seven samples of water, which, as I learn from the *Chronicle*, were lately sent to a London analyst, were all sent up together, it will follow, that during the time that must necessarily elapse before they can be examined, the organic matter they contained will have, at least in great part, disappeared, and the report, as giving any indication of the purity of the waters, will be quite worthless.

"Of the three columns in the following Tables, the first represents the amount of nitrogen from ammonia as such and as urea, this may be of vegetable as well as of animal origin ; in the second column, the numbers represent the nitrogen derived entirely from animal organic matter.

"The third column gives the amount of nitric acid present : this nitric acid tells us one of two things, either that it is obtained from *present* sewage contamination, which has become oxydised in the manner already alluded to, or that it is derived from *previous* sewage contamination (in the shape of old cesspool soil, for instance), which, during a series of years, since the introduction of proper drainage, has been rendered innocuous by the purifying influence of the earth with which it has been brought in contact.

"The objectionably large quantity of nitrates, then, in the springs of Bath, since it is not in conjunction with a correspondingly large amount of organic matter, does not necessarily point to present sewage contamination, but rather to contact with old cesspool soil which has been rendered harmless in the course of time as already described ; at the same time, waters containing so large a proportion of nitrates must always be regarded with great suspicion, and can never be called good waters, though with, perhaps, hardly an exception, none on the list can be positively condemned as injurious."

TABLE

Showing the Amount of Organic Matter and Nitric Acid in the Bath Waters.

No.	Description of Water.	Nitrogen from Vegetable or Animal Or- ganic Matter.	Nitrogen from Animal Or- ganic Matter.	Nitric Acid.
		Grains in a Gallon.	Grains in a Gallon.	Grains in a Gallon.
1	City, Beacon Hill, from the springs	·00 13	·00 52	3·53
*2	City, Batheaston, from the springs	·00 19	·00 46	1·76
3	City, Beechen Cliff, from the springs	·00 06	·00 33	5·90
*4	Bathwick, from main, 8, Argyle Street	·00 00	·00 33	1·80
5	Circus, the two springs mixed ...	·00 66	·01 58	5·78
†6	Circus filtered	·00 06	·00 19	not estimated
*7	Charlcombe, springs in the Valley...	·00 05	·00 36	2·01
*8	Charlcombe, springs in rear of Wes- leyan College	·00 03	·00 26	1·48
†9	Dr. Hensley's, from the springs ...	·00 18	·00 46	0·89
10	Camden Crescent, supplied in part by Charlcombe Company ...			
11	Park Street, ditto ditto			
12	Lord Manvers, same as Beechen Cliff			
13	Cavendish Place (Dickenson), from Reservoir	·00 07	·00 59	5·21
14	Prior Park Road (Harris), from Prior Park Buildings	·00 05	·00 41	5·60
15	Sir James Rivers, same as Beacon Hill			
16	Miss Mant's, from Calton Villa ...	·00 03	·00 53	1·50
17	Caroline Buildings	·00 06	·00 39	5·90
18	Macaulay Buildings	·00 05	·00 43	1·48
19	Dr. Lloyd's, from Lyncombe Place...	·00 06	·00 58	7·11
20	Portland Place, supplied in part by Charlcombe Company			
21	Sillifant's, from Widcombe Crescent	·00 05	·00 40	1·18

Table of Various Waters Analysed at the London Institution.

Loch Katrine, from main in Glasgow	·00 11	·00 91	·08
Woodhead Water, supplied to Man- chester	·00 05	·00 40	not estimated
Thames, near Hampton Court, un- filtered	·00 08	·01 31	not estimated
Thames Water supplied to London by the West Middlesex Company	·00 05	·00 36	·25
New River Water, as supplied to London	·00 05	·00 29	·78
Southwark and Vauxhall Company's Water at London Bridge ...	·00 24	·01 15	·41

* Nos. 2, 4, 7 and 8, are comparatively good waters.

† This water (No. 6), after the completion of the efficient method of filtration now in contemplation by the Company, will be one of the purest in Bath.

‡ As this water (No 9) was disparagingly spoken of in a letter to the *Chronicle* some time back, I have carefully repeated my analysis, but with a like result; it contains actually less nitric acid than any of the other waters, and is as good in other respects as the Batheaston water.

These analyses, compared with those in the earlier part of this volume, speak for themselves, and require no further remarks from me.

POPULATION.

At the census of 1861, the *population* of the Borough of Bath was 52,528 ; in the middle of the year 1868 it was estimated by the Registrar General at 53,246, or an increase in 7 years of 718, this estimate being deduced from the excess of births over deaths in that period ; and I therefore propose to take that estimate as the approximate population of the city for this year, and to base my calculations upon it.

MARRIAGES.

The number of these was 579 ; the marriage rate for the year 10·8 per 1,000.

BIRTHS.

The number of births was 1,413 ; being 64 more than in 1867 : the birth rate 26·53 per 1,000. For all England the birth rate was 36·31 per 1,000. The increase in population is greater in the northern district of England and in London, than in the west ; the difference between the birth rate of Bath and that of all England is very striking, amounting to nearly 10 per 1,000 during 1868.

VACCINATIONS.

On 1st January, 1868, the New Vaccination Act came into operation, and a central station was opened for Bath on 10th August, in York Street, under the superintendence of Mr. Biggs. From that date to the end of the year, 250 children were vaccinated at this station. Through the courtesy of Mr. Biggs, I shall be enabled in future reports to obtain more accurately the number of children vaccinated in the city. A large number are vaccinated as private patients by medical men.

DEATHS.

The total number of deaths registered in the city and borough during the year 1868 was 1,148, giving a death rate

of 21·56 per 1,000. The mortality of the city has not been so low since 1856, the nearest approaches being in the years 1857, 1861, and 1862, when the number of deaths was 1,159, 1,157, and 1,159, respectively. Of the 1,148 deaths in 1868, 123 occurred in the Workhouse, of which all but 12 were Borough parishioners, 70 in the Royal United Hospital, 6 in the Mineral Water Hospital, 2 in St. John's Hospital, and 1 in the Homœopathic Hospital, giving a total of 202 deaths in the public institutions of the Borough, or more than one-sixth of the whole.

The death rate for all England in the year 1868 was 22·20 per 1,000.

The death rate of English cities and towns, whose population approximates to that of Bath, during the year, was as follows :—

			Population.		Death rate. per 1,000.
Stockport	...	...	59,882	...	31·42
Derby	...	...	57,141	...	28·02
South Shields	...	...	62,357	...	27·84
Walsall	...	...	52,630	...	24·55
Southampton	...	...	51,706	...	21·71
Bath	...	...	53,246	...	21·56
York	...	...	55,364	...	21·17
Chatham	...	...	59,485	...	20·29
Dudley	...	...	50,845	...	20·19
Brighton	...	...	87,842	...	20·10
Swansea	...	...	64,005	...	20·05
Cardiff	...	...	60,000	...	19·04
Devonport	...	...	50,440	...	17·35
Cheltenham	...	...	43,431	...	17·35

Of 14 Large Cities and Towns in Great Britain.

	per 1,000		per 1,000
Manchester	... 32·01	Newcastle	... 25·54
Salford	... 30·72	Dublin	... 24·67
Glasgow	... 30·42	Hull	... 24·38
Liverpool	... 29·22	Birmingham	... 23·94
Leeds	... 27·90	London	... 23·31
Edinburgh	... 26·87	Bristol	... 22·83
Sheffield	... 26·63	Bath	... 21·56
Bradford	... 26·46		

TABLE XL.
Deaths in each District.

Districts and Parish.	WINTER QUARTER.			SPRING QUARTER.			SUMMER QUARTER.			AUTUMN QUARTER.			YEAR.		
	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Abbey ...	39	44	83	32	32	64	32	30	62	35	33	68	138	139	277
West Walcot ...	36	68	104	25	26	51	24	35	59	27	38	65	112	167	279
East Walcot ...	23	33	56	18	23	41	22	27	49	18	40	58	81	123	204
Widcombe ...	45	49	94	38	33	71	35	29	64	36	37	73	154	148	302
Bathwick Parish	17	11	28	9	10	19	8	11	19	9	14	20	40	46	86
Totals ...	160	205	365	122	124	246	121	132	253	122	162	284	525	623	1148

The following Table is a summary of No. 42, in which the causes of death are given in detail :—

TABLE XLI.
Causes of Death.

Classes and Orders of Diseases.	AGES.		Total.	Deaths from all causes.
	Under 5 Years.	Above 5 Years.		
CLASS I.—Zymotic.				
Order 1. Miasmatic ...	71	40	111	
„ 2. Enthetic ...	6	...	6	
„ 3. Dietic... ...	1	...	1	
„ 4. Parasitic ...	1	...	1	119
CLASS II.—Constitutional.				
Order 1. Diathetic ...	9	130	139	
„ 2. Tubercular ...	77	127	204	343
CLASS III.—Local.				
Order 1. Nervous System	52	114	166	
„ 2. Circulatory „	1	52	53	
„ 3. Respiratory „	67	124	191	
„ 4. Digestive „	6	58	64	
„ 5. Urinary „	...	17	17	
„ 6. Generative „	...	7	7	
„ 7. Joints ...	...	10	10	
„ 8. Skin ...	...	4	4	512
CLASS IV.—Growth and Decay.				
Order 1. Children ...	20	...	20	
„ 2. Adults ...	...	1	1	
„ 3. Old People ...	...	91	91	
„ 4. Nutrition ...	15	4	19	131
CLASS V.—Violent Deaths.				
Order 1. Accident ...	13	19	32	
„ 2. Suicide ...	...	2	2	
„ 3. Homicide ...	...	1	1	35
CLASS VI.—No cause assigned.	2	6	8	8
	341	807	...	1148

TABLE XLII.

Deaths at all Ages and from all Causes in 1868.

Diseases.	Under 1 year.	1 Year.	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		
													Under 5.	Above 5.	Total.
Class 1.— <i>Zymotic Diseases.</i>															
Order 1.— <i>Miasmatic.</i>															
1 Measles ...	1	1	1	2									5		5
2 Scarlet Fever...				1									1		1
3 Diphtheria ...		1		1			1						2	1	3
4 Croup ...		3			3			1					6	1	7
5 Hooping Cough ...	8	7	3	2		1	1						21	1	22
6 Typhoid Fever ...			1	1			1	3	3		1		2	8	10
7 Erysipelas ...										3				3	3
8 Pyæmia ...								1		1				2	2
9 Dysentery ...									1	4				5	5
10 Diarrhoea ...	29	3	1				1	2	4	8	4		33	19	52
11 Infantile Cholera ...	1												1		1
													71	40	111
Order 2.— <i>Enthetic.</i>															
1 Syphilis ...	6												6		6
													6		6
Order 3.— <i>Dietic.</i>															
1 Want of Breast Milk	1												1		1
													1		1
Order 4.— <i>Parasitic.</i>															
1 Aphthæ ...	1												1		1
													1		1
													79	40	119
Class 2. — <i>Constitutional Diseases.</i>															
Order 1.— <i>Diathetic.</i>															
1 Gout ...										2	2	2		6	6
2 Rheumatism ...								1		1				2	2
3 Anæmia ...	9								1	4	5	2	9	12	21
4 Diabetes ...								1						1	1

TABLE XLII. (Continued.)

Diseases.	Under 1 Year.	1 Year.	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.	Total.
													Under 5.	Above 5.	Total.	
5 Asthma ...										6	2	1		9	9	
6 Dropsy ...								5	12	30	14	3		64	64	
7 Cancer ; Scirrhus ...									3	12	5			20	20	
8 Cancer ; other forms...									3	5	1			9	9	
9 Dry Gangrene ...									1	1	4			6	6	
10 Addison's Disease ...									1					1	1	
													9	130	139	258
Order 2.— <i>Tubercular Diseases.</i>																
1 Scrofula ...				1			1	2	1	1			1	5	6	
2 Psoas Abscess ...	1												1		1	
3 Mesenteric Disease ...	6	3	2			1	1	3					12	4	16	
4 "Marasmus" ...	32	11	1	2	1			1	2		1		47	4	51	
5 Consumption ...	1				1		2	47	45	13	1		2	108	110	
6 Spitting of Blood ...									1	1				2	2	
7 Tubercular Meningitis	6	2	4		1	1	3	1					14	4	18	
													77	127	204	462
Class 3.— <i>Local Diseases.</i>																
Order 1.— <i>Diseases of Nervous System.</i>																
1 Meningitis ...	4					1	1	2	4	2	1		5	10	15	
2 Encephalitis ..								1	1	4	1			7	7	
3 Myelitis ...				1						1	1		1	2	3	
4 Apoplexy ...	1							1	4	19	9	4	1	37	38	
5 Paralysis ...				1				1	4	14	7	9	1	35	36	
6 Chorea ...									1					1	1	
7 Mania... ..										1				1	1	
8 Delirium Tremens									2					2	2	
9 Epilepsy ...					1		6		3	1			1	10	11	
10 Tetanus ...							1	1	3					5	5	
11 Convulsions ...	29	6	2	2	2		1						41	1	42	
12 Eclampsia ...	1	1											2		2	
13 Cerebral Softening									1	1	1			3	3	
													52	114	166	628

TABLE XLII. (Continued.)

Diseases.	Under 1 Year.	1 Year.	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.	Total.
													Under 5.	Above 5.		
Order 2.— <i>Diseases of the Circulatory Organs.</i>																
1 Pericarditis								2						2		2
2 Endocarditis								1						1		1
3 Valvular Disease of the Heart								1		2	2	1		6		6
4 Heart Disease — <i>form not stated</i>			1					2	7	15	8	2	1	34		35
5 Fatty Degeneration of Heart										1	1			2		2
6 Aneurism									1					1		1
7 Angina Pectoris											1			1		1
8 Syncope								1		4				5		5
													1	52	53	681
Order 3.— <i>Diseases of the Respiratory Organs.</i>																
1 Laryngitis				1						2			1	2		3
2 Œdema Glottidis	1												1			1
3 Bronchitis	13	4	4		1		2		7	33	25	10	22	77		99
4 Pleurisy								2	3	2	1	1		9		9
5 Hydrothorax										1				1		1
6 Empyema									1					1		1
7 Pneumothorax										1				1		1
8 Congestion of Lungs ...	1	1				1	1		1	2			3	4		7
9 Pneumonia	13	9	9	5	2	2		3	6	8	3		40	20		60
10 Emphysema								1	1	1				3		3
11 "Disease of Lungs"— <i>no variety named</i>								3	1	2				6		6
													67	124	191	872
Order 4.— <i>Diseases of the Organs of Digestion.</i>																
1 Stomatitis	1	1		1			1						3	1		4
2 Gastritis									1	4	3			8		8
3 Enteritis	1			1				2	2		2		2	6		8
4 Peritonitis										1				1		1

TABLE XIII. (Continued.)

Diseases.	Under 1 Year.	1	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.	Total.
													Under 5.	Above 5.		
5 Pleus												1		1	1	
6 Intussusception ...										1				1	1	
7 Hernia								1		3	1			5	5	
8 Ulcer of Stomach ...											1			1	1	
9 Stricture of Œsophagus									1	1				2	2	
10 Hæmatemesis ...									1	2				3	3	
11 Melæna											1			1	1	
12 Splenitis										1				1	1	
13 Hepatitis									2	3	2			7	7	
14 Jaundice									2	1				3	3	
15 Cirrhosis									1	1				2	2	
16 Ascites	1							1	3	4	1	1	1	10	11	
17 Intestinal Obstruction							1		1	2	1			5	5	
													6	58	64	936
Order 5.— <i>Diseases of Urinary Organs.</i>																
1 Nephritis								1		1				2	2	
2 Ischuria											2			2	2	
3 Nephria								4	3	2				9	9	
4 Cystitis										1	3			4	4	
														17	17	953
Order 6.— <i>Diseases of the Generative Organs.</i>																
1 Ovarian Dropsy ...										1				1	1	
2 Uterine Disease ...									3	3				6	6	
														7	7	960
Order 7. — <i>Diseases of Joints and Muscles.</i>																
1 Caries							1	3		3				7	7	
2 Necrosis								1	1					2	2	
3 Muscular Atrophy ...									1					1	1	
														10	10	970

TABLE XLII. (*Continued.*)

Diseases.	Under 1 Year.	1	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals.		Total.	Total.
													Under 5.	Above 5.		
Order 8.— <i>Diseases of the Skin.</i>																
1 Purpura								2	1					3	3	
2 Lupus										1				1	1	
														4	4	974.
Class 4. — <i>Developmental Diseases.</i>																
Order 1.— <i>Of Children.</i>																
1 Premature Birth	12												12		12	
2 Spina Bifida	2												2		2	
3 Dentition	4	2											6		6	
													20		20	994
Order 2.— <i>Of Women.</i>																
1 Chlorosis									1					1	1	995
Order 3.— <i>Of Old People.</i>																
1 Old Age										11	35	45		91	91	1086
Order 4.— <i>Of Nutrition.</i>																
1 Atrophy	15								1	2	1		15	4	19	1105
Class 5.— <i>Deaths from Violence.</i>																
Order 1.— <i>Accident.</i>																
1 Burn						3		1		1			3	2	5	
2 Scald		1											1		1	
3 Rupture of Viscera			1				1		1	1			1	3	4	
4 Drowning							1		1	1				3	3	
5 Suffocation	6			1					1				7	1	8	
6 Fracture of Skull								2			1			3	3	
7 Fracture of Spine						1						1	1	1	2	
8 Concussion of Brain									1		3	1		5	5	
9 Shock... ..												1		1	1	
													13	19	32	1137

TABLE XLII. (*Continued.*)

Diseases.	Under 1 Year.	1	2	3	4	5	Under 10.	Under 30.	Under 50.	Under 70.	Under 80.	Above 80.	Totals			Total.
													Under 5.	Above 5.	Total.	
Order 2.— <i>Suicide.</i>																
1 Drowning ...	...									1				1	1	
2 Hanging ...	...										1			1	1	
														2	2	1139
Order 3.— <i>Homicide.</i>																
1 Murder ...	...								1					1	1	1140
Class 6.— <i>No cause assigned.</i>																
1 Visitation of God ...									1	1	1			3	3	
2 Natural Death ...										1				1	1	
3 Accidental Death ...									1					1	1	
4 Neglect at Birth ...	1												1		1	
5 Run over in Highway									1					1	1	
6 Found Dead ...	1												1		1	
														2	6	81148

DEATHS FROM CERTAIN CLASSES OF DISEASE.

The class of *Zymotic* diseases furnished 119 deaths. This shows an increase of 15 over 1867. The most fatal disease of this class was diarrhœa, which caused 52 deaths against 22 in 1867, or an increase of 30; this affection was most prevalent in the fall of the year, and occurred chiefly to very young children, of whom a large proportion were under the age of six months. Hooping cough caused 22 deaths against 17 in 1867, showing a slight increase; this disease was most prevalent in the early part of the year. Of the eruptive fevers 16 deaths occurred, 5 of which were from measles, 1 from scarlet fever, and 10 from typhoid fever. As regards the first two of these, the deaths in 1867 from measles were one less, and those from scarlet fever one more than in 1868; from typhoid fever there was a decrease of seven deaths over 1867. Several cases of typhoid were admitted into the United Hos-

pital in August and September, and upon tracing them to their sources, I found two of the houses from which they came in a very bad sanitary condition. At 3, Oxford Buildings, Lower Bristol Road, there were three cases, two of which recovered ; one was sent to the Hospital, but died after a long illness. In this house a common privy was situated in the back kitchen, and close to the cistern supplying the inhabitants of the house with drinking water. Another case occurred at 29, Oak Street. A man died from typhoid at Upper Trafalgar Place, and in this house and the last the sanitary condition was very defective ; this has been remedied. Deaths also occurred in Pierrepont Place, Avon Street, and in the United Hospital from this disease. No deaths were returned from typhus during the year, and I am not aware of there having been any cases in the Borough. Six children and one adult died of croup, and three deaths were returned from diphtheria. A death was returned at the end of July from infantile cholera ; the patient was a child aged seven months, and resided in one of the lodges on Cleveland Bridge. Deaths from diseases of the zymotic class amounted to rather more than one-tenth of the whole mortality during 1868, or about 2 per 1,000.

The second class, embracing *Constitutional Diseases*, caused 204 deaths against 322 in 1867, giving a decrease of 118. The most fatal disease of this class was pulmonary consumption, which furnished 110 deaths. In the preceding year there were 132 deaths, so that in 1868 the decrease in deaths from consumption was 22. On the other hand, dropsy caused 64 deaths in 1868, against 46 in 1867 ; marasmus, or wasting, 51 against 32 (47 being children) ; and mesenteric disease, 16 against 6. The deaths from the other diseases in this class, gout and spitting of blood excepted, were nearly in the same proportions in each year.

In 1868, *Local Diseases* caused 512 deaths ; in 1867 deaths from this class numbered 568, the decrease in the former year was 56. The most prominent diseases of this class are apoplexy, paralysis, convulsions, heart diseases, bronchitis, and pneumonia. Apoplexy gave an increase of 6 deaths in

1868 against the previous year, paralysis a decrease of 9, convulsions a decrease of 19, heart diseases an increase of 6, bronchitis a decrease of 52, and pneumonia an increase of 1. The mortality from the class was 9·6 per 1,000.

The fourth class embraces *Developmental Diseases*, or those which are especially prevalent during the *growth* and *decay* of life. In 1868 the deaths from this class numbered 131, in 1867, 144; showing a decrease of 13 in the former year. In both years the number of children who died from premature birth was the same. In 1867, 108 deaths were registered from senile decay, of which 60 were above 80 years of age. In 1868, 91 deaths were returned from the same cause, 45 being above 80 years of age. The number of persons who lived to that advanced age was, therefore, somewhat less in 1868 than in 1867. The mortality from this class of disease was 2·4 per 1,000.

In 1867, 47 deaths were registered from *Deaths by Violence*. In 1868 the number was 35, showing a decrease of 12. Deaths by accident show a great similarity in number in each year, fracture of the skull being more fatal in 1867 than in 1868. There were 5 deaths from suicide in 1867 against 2 in 1868, and there was but one death from homicide in 1868 against 5 in the previous year.

Deaths for which no cause was assigned were fewer in 1868 than in 1867.

TABLE XLIII.
Mortality from Contagious Diseases in 1868.

SUB-DISTRICTS.	Measles.	Scarlet Fever.	Diphtheria.	Hooping Cough.	Typhoid Fever.	Erysipelas.	Dysentery.	Diarrhoea.	Infantile Cholera.	Aphthæ.	Others.	Total.
Abbey	1	...	1	...	3	2	...	11	...	...	3	21
West Walcot ...	2	1	...	11	5	...	...	8	...	1	6	34
East Walcot ...	...	...	*2	2	...	...	...	7	1	...	3	15
Lyncombe & } Widcombe }	2	...	...	8	2	1	†5	19	...	...	3	40
Bathwick ...	...	...	...	1	...	...	...	7	...	...	1	9
Total ...	5	1	3	22	10	3	5	52	1	1	16	119

* These deaths occurred in one house, and in the same family.

† All in the Workhouse.

TABLE XLIV.
Mortality from Tubercular Diseases.

SUB-DISTRICTS.					Pulmonary Consumption.	Tubercular Meningitis.	Mesenteric Disease.	Others.	Total.
Abbey	...	...	...	...	30	6	3	25	64
West Walcot	...	...	...	...	25	3	1	15	44
East Walcot	...	...	...	...	15	3	2	6	26
Lyncombe and Widcombe	...	...	...	...	28	5	10	13	56
Bathwick Parish	...	...	...	...	12	1	...	1	14
Total					110	18	16	60	204

TABLE XLV.
Mortality from Diseases of Respiratory Organs.

SUB-DISTRICTS.					Bronchitis.	Pneumonia	Pleurisy.	Others.	Total.
Abbey	...	...	...	...	29	16	3	1	49
West Walcot	...	...	...	...	28	12	2	5	47
East Walcot	...	...	...	...	12	5	3	11	31
Lyncombe and Widcombe	...	...	...	...	23	22	1	5	51
Bathwick Parish	...	...	...	...	7	5	...	1	13
Total					99	60	9	23	191

TABLE XLVI.
Mortality from Accidents.

SUB-DISTRICTS.					Burnt.	Scalded.	Drowned.	Suffocated.	Fracture of Spine.	Fracture of Skull.	Concussion of Brain.	Others.	Total.
Abbey	...	...	...	...	3	1	...	2	...	2	4	4	16
West Walcot	...	...	...	...	1	...	1	1	1	...	...	1	5
East Walcot	...	...	...	...	...	...	...	1	...	...	...	...	1
Lyncombe and Widcombe	...	...	...	...	1	...	1	2	1	1	1	...	7
Bathwick Parish	...	...	...	...	...	...	1	2	...	...	...	...	3
Total					5	1	3	8	2	3	5	5	32

TABLE XLVII.

Mortality in the Workhouse, 1868.

DISEASES.	UNDER 5 YEARS.			ABOVE 5 YEARS.			Total.
	Males.	Females.	Total.	Males.	Females.	Total.	
Diarrhoea ... ..	...	...	...	1	4	5	5
Dysentery ... ..	...	...	...	4	1	5	5
Consumption ... ..	...	...	...	4	5	9	9
Mesenteric Disease ...	1	1	2	2	...	2	4
Marasmus	3	3	6	...	...	...	6
Apoplexy ... ..	...	...	...	3	2	5	5
Diseases of Brain : Paralysis	1	5	6	4	9	13	19
Epilepsy	1	...	1	1	2	3	4
Diseases of the Heart ...	...	...	...	2	1	3	3
" " Lungs ...	7	6	13	8	2	10	23
" " Liver ...	...	...	...	1	...	1	1
Atrophy	2	...	2	1	...	1	3
Old Age ... ..	...	...	...	8	11	19	19
Fever ... ..	...	...	...	...	1	1	1
Accident ... ..	...	...	...	1	...	1	1
Others	1	1	2	7	6	13	15
Total	16	16	32	47	44	91	123*

* Of the above, 111 were admitted from Parishes within the Borough of Bath and 12 from Country Parishes.

TABLE XLVIII.

Mortality in other Institutions, in Bath, in 1868.

Mineral Water Hospital	St. John's Hospital	Homœopathic Hospital	St. Catherine's Hospital	Establishment for the Aged.*	Total of Deaths in the Hospitals and Workhouse.
6	2	1	...	2	204

* No 16, Westgate Buildings.

TABLE XLIX.

Mortality in the Royal United Hospital, 1868.

DISEASES.	UNDER 5 YEARS.			ABOVE 5 YEARS.			Total.
	Males.	Females.	Total.	Males.	Females.	Total.	
Typhoid Fever	1	2	3	3
Cancer	1	2	3	3
Addison's Disease	1	...	1	1
Mesenteric Disease	1	1	1
Consumption	6	3	9	9
Apoplexy	1	...	1	1
Paralysis	1	...	1	1
Delirium Tremens...	1	...	1	1
Tetanus	3	2	5	5
Diseases of the Heart	1	5	6	6
Bronchitis	2	2	4	4
Pneumonia ...	1	...	1	6	...	6	7
Diseases of the Liver	1	1	1
Nephria	1	1	1
Diseases of Bones and Joints	1	1	2	2
Burns and Scalds ...	2	...	2	1	1	2	4
Fractures	4	...	4	4
Concussion of Brain	1	1	1
Rupture of Viscera	1	1	2	...	2	3
Exhaustion after operation	2	...	2	2
Others	5	5	10	10
Total ...	3	1	4	39	27	66	70

TABLE L.

Prices of Provisions and the Death Rate, 1868.

Quarter Ended	Wheat per Quarter		Potatoes per Ton.	Beef per lb.	Mutton per lb.	Mean Height of Barometer.	Death Rate per 1,000.
	s.	d.	s.	d.	d.	In.	
31st March ...	72	2	147 6	5 5	5 5	29·877	27·4
30th June ...	71	10	150 0	5 5	5 5	29·897	18·6
30th September ...	59	1	147 6	5 5	5 5	29·788	19·7
31st December ...	51	11	105 0	5 5	5 5	29·697	21·3

TABLE LI.

Patients Treated in the Institutions in 1868.

	Royal United Hospital.	Mineral Water Hospital.	DISPENSARIES.			Poor Law Union.*	Others.	Total.
			Eastern.	Southern	Western.			
In-Patients ...	1021	623	...	...	...	...	...	1,644
Out-Patients ...	13,437	...	3353	675	1293	2906	3289	24,953
Total ...	14,458	623	3353	675	1293	2906	3289	26,597

* Including the Workhouse.

Number of Tramps relieved at "The Refuge," Abbey Green—5,881.

AVERAGE AGE AT DEATH.

Taking the deaths from all causes, 341 were under the age of 5 years, and 807 above that age. Of those who died between birth and the completion of the fifth year, 209 were under the age of six months; 56 between six months and the end of the first year; 30 died during the second year of life, 23 during the third, 15 during the fourth, and 8 during the fifth. Above the age of five years and between that and the end of the tenth year, there were 21 deaths; from the end of the 10th to the end of the 30th, 114; to the end of the 50th, 157; to the end of the 70th, 269; between 70 and 80 years, 161; and above 80 years, 85. It will be seen that during the year 1868 the period of life during which the largest number of deaths occurred was that between the ages of 50 and 70 years, and that in which the lowest mortality occurred was the fifth year. The deaths above the allotted age of man—70 years—numbered 246; those below the age of 30 years amounted to 476, making together 722, leaving a total of 426 deaths which occurred during the middle period of life—from 30 to 70 years, or a death rate of 8 per 1,000.

INTERMENTS.

The following burials took place in the Cemeteries. In the Abbey, 72; Lyncombe and St. James's, 313; Lansdown, 45;

Locksbrook (Walcot), 321 ; St. Saviour's, 48 ; St. Michael's, 38 ; Bathwick, 25 ; Roman Catholic, 27 ; making a total of 889 burials in the cemeteries, and 259 interments in other places of sepulture, 5 of the latter being in the Independents' Burial Ground, and 7 in Lady Huntingdon's. A few were probably interred out of Bath.

PERSONS ABOVE SIXTY YEARS OF AGE.

In the early part of the year a question was raised by some members of the Board of Health as to the number of persons living in Bath of the age of 60 years and upwards. From the census returns of 1861 I obtained the following results :—

TABLE LII.

Registration District of Bath.

	Under 5	5	10	15	20	25	30	35	40	45
Males ...	3507	3388	3446	2771	2164	1849	1681	1587	1562	1345
Females	3668	3379	3421	4050	4192	3425	2890	2560	2495	2086
Total...	7175	6767	6867	6821	6356	5274	4571	4147	4057	3431

	50	55	60	65	70	75	80	85	90	95
Males ...	1261	1038	1007	717	537	283	115	40	9	1
Females	1937	1557	1479	1081	898	508	280	97	22	3
Total...	3198	2595	2486	1798	935	791	395	137	31	4

Total of persons of 60 years and upwards, males, 2,709 ; females, 4,368—7,077, or nearly 1 in 10.

The proportion of persons above 60 years of age to those under that age in all England was nearly 1 in 14.

SANITARY INSPECTION.

Five hundred and seventy-five houses have been visited by the Inspector or myself during the year in the poorer districts

of the city, besides slaughter houses, common lodging houses, courts, mews, and other places, and their condition has been reported by me to the Board. The localities inspected were Arundel Court, Millbrook Cottage, Widcombe, James's Buildings, Rochfort Cottages, courts leading out of Bathwick Street, the Villa Fields, the Ambury, St. James's Court, Amery Lane, Wine Street, Back Street, Abraham's Court, Lampard's Buildings and courts, courts leading from Broad Street, and the whole of the Dolemeads, the latter comprising 275 cottages. Several single and isolated houses were visited as well. In nearly all, privies were the prevailing closet accommodation, some of them being very foul and offensive. Lampard's Buildings, with 29 houses, had but three with proper water closets. The earth closet system was recommended for trial in the Villa Fields, a district well adapted for it; a closet was erected adjoining one of the cottages, and has been found to answer exceedingly well. Some others have since been erected. Typhoid fever broke out in a house in Oxford Buildings, Lower Bristol Road; here a privy was found *in* the kitchen, and close to the cistern supplying the tenants with drinking water; this has been remedied. Overcrowding, with bad ventilation, bad closet accommodation, and dirt, were found at 1, Abbey Street, and 41, James Street—houses let out in apartments—the former when visited containing 52 inhabitants. The condition of the brook behind Widcombe Parade has been reported by me three times during the year, but it has not been remedied. A large sewer from Bathwick Hill, at the side of the Great Western Railway, near the Bathwick tunnel, I found to be open for a short distance, and to be badly constructed; adjoining it were two large cesspools. Large numbers of pigs have been removed from crowded localities in the city. The water supply to many of the houses visited was found to be insufficient—in some there was none at all; the quality of the water varied with the locality; in the Dolemeads it is good, excepting where the supply is from wells; in the Villa Fields the chief supply is from wells, and is bad in quality in the majority of instances. The lodging house, 16, Little Corn Street, has been supplied with water

(see page 28); 41, James Street is closed. I purpose continuing the system of inspecting the poorer districts of the city, and trust that the work of improving the sanitary condition of these localities, though slow, will be accomplished with as little delay as is practicable.

The following amounts were expended in sewers from September, 1857, to September, 1868 :—

From Sept., 1857, to Sept., 1858	...	986	5	6
" 1858 " 1859	...	1090	16	6
" 1859 " 1860	...	2525	0	9
" 1860 " 1861	...	2705	5	9
" 1861 " 1862	...	3242	4	4
" 1862 " 1863	...	1616	12	8
" 1863 " 1864	...	1271	8	7
" 1864 " 1865	...	1424	9	4
" 1865 " 1866	...	1393	3	9
" 1866 " 1867	...	1395	18	8
" 1867 " 1868	...	1928	14	9
Total in eleven years		...£19,580	0	7

TABLE XXXVIII. (Page 74.)

High Temperatures in Shade, July, 1868.

			a			Date.
Tunbridge	...	...	100·5	...	...	22nd
Greenwich	...	...	96·6	...	...	"
Lymington	...	...	94·5	...	...	"
Maidenhead	...	...	92·	...	...	"
Banbury	...	...	90·	...	...	21st
Epping	...	...	96·	...	...	22nd
Ross	...	...	97·	...	...	"
Hereford	...	...	96·1	...	...	"
Evesham	...	...	97·3	...	...	"
Boston	...	...	94·5	...	...	"
Derby	...	...	92·	...	...	"
Beverley	...	...	94·	...	...	"
Cardiff	...	...	89·	...	...	15th
London	...	...	93·3	...	...	21st
Bath	{ Paragon		89·8	}	...	22nd
	{ Literary Institution		90·6			

[This Table was accidentally omitted during the compilation of the book. —
C. S. B.]

It should also be remarked that, in addition to the amount stated at p. 100, as having been expended by the Corporation, in Sewage and Drainage, an equivalent sum has been spent by private individuals.



1869





